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1962-1981

by

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A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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Date Feb 18/85

ABSTRACT

The purposes of this study are threefold. First, to describe the Tanzanian economy and its performance, with particular reference to the balance of payments and the government's fiscal, monetary, and commercial policies over the post independence period 1962-1981. Second, to formulate and estimate a short-run macroeconomic model. The monetary approach to the balance of payments provides the context in which this study approaches and interprets the role of monetary and real variables in balance of payments adjustment. Third, to carry out several simulation experiments to explore the role of fiscal, monetary, and commercial policies over the key macroeconomic variables of the model.

The first part of the study describes the Tanzanian economy and criticaly evaluates government's agricultural and industrial policies in terms of their implications for the country's exports and imports. The main features of the monetary, fiscal, and commercial policies are summarized in 22 tables.

The second part of the study extends the single-equation monetary model of the balance of payments in a way relevant to the short-run context with which the policy-makers are concerned. This extension, characterized by variations both in prices and output, has been achieved by constructing a 14-equation simultaneous system with the following main features:

i)The model defines the balance of payments on both current and capital accounts. However, unlike the income/absorption approaches to the balance of payments in which the balance of payments adjustment is a repetitive flow equilibrium, the model designed here takes explicitly into account one aspect of the adjustment process, stock-adjustment, in the way suggested by Praise(1961) and Dornbusch(1973).

ii)The behavior of the monetary authority is explicitly modeled by specifying a central bank reaction function which relates domestic credit to both domestic and foreign target variables.

iii)The government fiscal operations are formulated by specifying a treasury financing requirements equation which sets the framework for examining quantitatively the impact of domestic and external variables on the fiscal deficits. The model is, then estimated and analysed using Tanzanian annual data for the period 1962-1981.

The third part of the study carries out several simulation experiments to explore the impact of changes in the exogenous variables and in other policy variables on the behavior of key macroeconomic variables of the model. Elasticity multipliers are also calculated and compared with the parameter estimates of the structural equations.

The major findings of this study are that;
i)both real and monetary variables influence the behavior of the balance of payments;

ii)the monetary and fiscal authorities appear to exercise certain discretionary power over the fiscal and monetary variables;

iii)in comparison with domestic targets, external targets appear to be given less weight in the conduct of monetary policy.

iv)the direct impacts of the monetary variables on primary exports and imports, as revealed by the parameter estimates of the demand for imports and supply of exports, are generally smaller than the corresponding elasticity multipliers; and

v)a stabilization program which includes a demand management policy and an exchange rate policy is more effective in improving the balance of payments than a stabilization program which relies only on external assistance.

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I. INTRODUCTION

The last two decades witnessed a growing literature aimed at reviving interest in the monetary aspects of balance-of-payments adjustment mechanism which Keynesian approaches to the balance of payments had pushed into the background. The results have been a theoretical refinement and formulation of the "price-specie-flow" adjustment mechanism, developed by David Hume in mid-18th century, and an accompanying flow of empirical work concerning its validity.

In the framework of the new monetary approach, the balance of payments is viewed essentially as a monetary phenemenon which is determined by the incipient state of excess demand for money. More specifically, for a small open country under a fixed exchange rate, the international reserve flows are postulated to vary positvely with the country's rate of economic growth and inflation and negatively with the rate of change of the real rate of interest. Furthermore, it is postulated that for a given quantity of money demanded and a money multiplier, changes in domestic credit are fully offset by changes in international reserve flows. As such, the nominal supply of money is considered to be beyond the control of the monetary authority. All the monetary authority can do is determine the division of the backing of the money supply demanded by the public between international reserves and domestic credit. Finally, the monetary approach to the balance of payments concentrates on the long-run consequences of policy and parametric changes on the behavior of the balance of payments, and takes an eclectic view of the process of adjustment through which these long-run consequences come about.

Recently, a number of attempts have been made to test the monetary approach hypothesis in the context of developing economies (Miller and Askin, 1976; Khan, 1976; Aghevli and Khan, 1977 and 1980; Wilford, 1978; and Khan and Knight, 1981 and 1982). These tests are frequently carried out under assumptions that (a)domestic credit is a policy variable under the control of the monetary authority; (b)changes in the demand for money or its arguments, output, price, and the real of rate interest, are exogenously determined and they are independent of the country's balance of payments position; and (c) no sterilization takes place. Though these studies are interesting and shed light on the monetary aspects of the balance of payments adjustment mechanism and on the possible policy content of a stabilization program, they are not without their own shortcomings.

i)More recently, it is contended, among others, by Frenkel, Gylfson and Helliwell(1980) and Officer and Kreinin(1978) that there are several methodological and statistical problems inherent in the single equation monetary model which make it difficult to provide a meaningful interpretation of the parameters of the model.

Frenkel, Gylfason and Helliwell argue that the standard flow equation is nothing more or less than a demand-for-money equation combined with an identity such that an estimate of the offset coefficient is not an estimate of the reduced form effect of monetary policy changes on the international reserve flows, but of -1. In any model with a correctly specified demand-for-money equation, "the estimate a_5 (offset coefficient) should be equal to -1; in a model in which credit expansion had a big effect on price, output, or the rate of interest the partial effect a would still be -1, for given values of P (price), Y (output) and r (interest rate)." (Frenkel el at, p. 586.)

ii)It is a common practice in the monetary models to take domestic credit as a policy variable under the control of the monetary authority. This treatment of domestic credit, as Goodhart put it,

> abstracts from *all* the main operational problems facing the authorities. It reveals nothing about the difficulties possibly confronting the authorities in achieving any desired level for the monetary base.... It gives no idea of the underlying forces with which the authorities may have to contend in controlling the money stock," (Goodhart, 1975, p. 153.)

This is more so in developing economies where, (a)the market for government securities is not well developed and the government relies heavily on the central bank to finance its deficit; (b)the foreign sector provides a relatively large proportion of the government revenues as well as most of the industrial intermediate and capital goods utilized in the production of domestic output; and (c)the government's budgetary position is generally more susceptible to fluctuations in the country's balance of payments position than it is in developed economies. Under such circumstances, fluctuations in the balance of payments tend to have a destabilizing effect on output, government revenues and thereby on the money supply as the government attempts to finance its deficit by borrowing from the central bank.

These interrelationships between the domestic credit and the government budgetary position as well as the balance of payments suggest a need for a system of simultaneous equations which; (a)takes explicitly into account these interrelationships; and (b)concentrates on the short-term and medium-term aspects of the balance of payments adjustment and parametric changes with which the policy makers are concerned and which is characterized by both variations in output and prices. This study is an attempt in that direction.

The purpose of this work is threefold. The first objective is to construct a short-run model of the balance of payments which allows for the output, price, domestic monetary base, and the fiscal deficits to be determined within the model. To pursue this objective the following steps are taken.

i)The model designed here defines the balance of payments on the current and capital accounts which allows us to examine the behavior of each individual account. However, unlike the income/absorption approach to the balance of payments in which the balance of payments process is a repetitive flow equilibrium, the model developed here takes explicitly into account one aspect of the adjustment process, namely stock-adjustment, along the ways suggested by Prais(1961)and Dornbusch(1973).

ii)The behavior of the central bank is explicitly modeled. Taking domestic credit as a monetary policy instrument the central bank reaction function is identified as a function of the government overall deficit, international reserve flows and other domestic target variables.

iii)The government fiscal operations are explicitly formulated by specifying a treasury financing requirements equation which sets the framework for examining quantitatively the impact of structural factors on the government fiscal operations.

The model specified is a simultaneous equation system, containing seven behavioral relationships and seven identities. The behavioral equations describe demand for imports, supply of the primary exports, expected rate of inflation, domestic credit, treasury financing requirements, private expenditures, and changes in the price level. The behavior of real income, aggregate expenditures, nominal stock of the money supply, changes in the international reserves, and the government expenditures are described by five definitional equations.

The second objective of this study is to estimate and test the validity of the monetary approach to a small non-oil exporting developing economy such as Tanzania on the basis of annual data for the period 1962-1981. The performance of the model is evaluated both in terms of the model's ability to track the time paths of the endogenous variables and statistical tests of significance of the monetary approach hypotheses.

There are basically two reasons for choosing Tanzania as a case study. First, specification of the monetary model for an individual developing nation, such as Tanzania, allows us to incorporate those institutional factors pertaining to the balance of payments and the operation of the fiscal and monetary authorities which are generally left out in the cross sectional studies. Essentially, the model designed in this study describes a developing economy that is small relative to the rest of the world and maintains a fixed exchange rate. Financial markets are quite underdeveloped and both imports and capital flows are subject to various government control measures. Naturally, not all developing economies would fit exactly these assumptions, but they are shared by a large number of the developing nations not generally abundant in natural resources. Second, the balance of payments crisis faced by Tanzania in 1974-75 and the government's balance of payments stabilization policy response provides a framework for testing the effect of two contrasting stabilization programs which have been subject to an intensive controversy in the literature during the past decade (Williamson, 1980; Foxley, 1980; Cline and Weintraub, 1981; Khan and Knight, 1981; and Dornbusch, 1982). The quantitative aspect of this study may shed light on the relative effectiveness of a stabilization policy which relies heavily on foreign borrowing, as was the case for Tanzanian stabilization program in 1974-75, and one which combines a demand management policy with an exchange rate policy to close the gap between the total domestic expenditures and the real income.

To pursue these objectives the following outline will be followed.

Chapter II will review the literature on the monetary approach to the balance of payments and empirical works undertaken in the context of developing economies. Chapter II also discusses the relevance of the monetary approach to the developing economies.

Chapter III summarizes the main features of the Tanzanian balance of payments and monetary and fiscal structures for the period under study. In order to clarify the constraint which increasing Treasury financing requirements imposed on the central bank, the money supply process in Tanzania is analysed in greater detail.

Chapters IV and V constitute the main core of this study. In chapter IV attempts are made to construct a short-run model of the balance of payments which incorporates both monetary and the real variables into the balance of payments adjustment process. Specification of each individual equation and the rationale behind it are also fully discussed in chapter IV. The model is estimated using Tanzanian data for the period 1962-1981 and the results are summarized in chapter V.

Chapter VI examines the validity of the entire model in explaining historical data using simulation and multiplier analysis. Various summary measures of forecast accuracy are constructed to evaluate the model's ability in tracking the historical data. Several policy simulations are also carried out to explore the consequences of changes in the exogenous variables and in the other policy variables on the key macroeconomic variables of the model.

The main findings of this study as well as its shortcomings and inadequacies are summarized in chapter VII.

II. MONETARY APPROACH TO THE BALANCE OF PAYMENTS: A REVIEW ON LITERATURE

A. Introduction

The last two decades witnessed a growing literature in reviving interest in the monetary aspects of balance of payments and adjustment menchanism which had been ill-treated in post World War II theories of the balance of payments. The result has been a theoretical refinement and formulation of the "price-specie-flow" adjustment mechanism, developed by David Hume in mid-18 century, by Mundel(1968), Johnson(1972), Dornbusch(1973) ,and others.

The basic assumption of the new monetary approach to the balance of payments theory is that consequences of surpluses/deficits in the balance of payments are not or cannot, within a period relevant to the policy analysis, be sterilized as it is assumed by the traditional income/absorption approaches. Second, in contrast to the income/absorption approaches in which the balance of payments adjustment mechanism is viewed as a real phenomenon governed by output and relative prices, the new monetary approach invariably assumes that a country's prices and interest rates are given by the world prices and interest rates and move rigidly in line with them. The level of output and its rate of growth are assumed to be determined by population growth and technological progress.

The consequences of these assumptions are, as Johnson (1972) notes,

> that domestic monetary policy does not determine the domestic money supply but instead determines only the division of the backing of the money supply to public demand, between international reserves and domestic credit. Monetary policy in other words, controls the volume of domestic credit and not the money supply; and control over domestic credit controls the balance of payments and thus the behavior of the country's international reserves (Johnson, 1972, p. 238.)

B. Main Features of the Monetary Approach

A wide class of monetary models have emerged in the literature on the basis of these assumptions. Common to all these models is a set of broad principles which constitute the main features of the monetary approach. Following Mussa(1976) these features can be summarized as follows:

1. *The balance of payments is an essentially (but not exclusively) a monetary phenomenon.*

The term "the balance of payments" refers to items that are 'below the line' in the overall balance of payments which constitute the official settlement account or money account. The monetary approach applies Walras' law to the country's international spending and lumps, 'items above the line' into one single category and recommends an analysis of this net in terms of the behavioral relationships directly relevent to the money account. The balance of payments surpluses or deficits reflect the excess demand for/supply of international money and thus should be viewed as monetary phenomena.

2. *The demand for and supply of money.*

Since the balance of payments is essentially a monetary phenomenon it should be analysed with the tools and concepts of monetary theory, i.e. models that, as Johnson notes, "explicitly specify monetary behavior as a (usually not integrated) residual of real behavior." (Johnson, 1977a, p. 217.)

3. *A concentration on the long-run consequences of policy and parametric changes.*

The monetary approach concentrates on the long-run consequences of policy and parametric changes for the behavior of the balance of payments and takes an eclectic view of the process of adjustment through which these long-run consequences come about.

C. Policy Implications of the Monetary Approach

The monetary approach to the balance of payments theory has a number of simple, but fundemental, implications for policy making, some of which contradict those of the traditional approaches to the balance of payments.

First, balance of payments deficits or surpluses are inherently transitory and self-correcting. Government polices could only influence the speed of adjustment either directly by influencing the domestic monetary base or indirectly by influencing one or more of arguments of demand-for-money.

Second, all balance of payments disequilibria could be handled by the use of domestic monetary policy. Devaluation, import restrictions and export promoting policies are, as Johnson notes,

> substitutes for monetary contraction, logically having the same effects but achieving it by deflating the real stock of money through open market sales, and its effect is a transient one of accelerating the inherent natural process of adjustment to equilibrium (Johnson, 1977b, p. 265).

Third, contrary to some widespread belief, a high growth rate of domestic ouput improves the balance of payments through increasing the demand for money.

Finally, under a fixed exchange rate regime, inflation is a world phenomenon, which

> can not be prevented by national monetary policy or its ineffective substitute, a national 'wage-price policy', and can only be counteracted by any national policy if the currency is first free to find its own level on the foreign exchange market

(Johnson, 1977b, p. 266).

To examine more carefully the assumptions and the method of analysis underlying the monetary approach to the balance of payments in what follows, we present a simple monetary model which has been used widely in the empirical studies. This monetary model also forms the point of departure of this study.

D. The Standard Reserve-Flow Equation

Among various theoretical monetary models of the balance of payments adjustment, the standard reserve-flow equation is one of the most widely used models in empirical studies. This monetary model, as formulated by Johnson(1972) and Zecher(1976), may be defined in seven basic equations. Before specifying these equations it is worth stating explicitly the assumptions underlying this monetary model.

The country under consideration is a small, open economy with a fixed exchange rate regime. It is assumed that it is growing over time and small enough and diversified enough in relation to the world economy for its price level to be the world price level, and its interest rate the world interest rate. The free international mobility of capital and goods ensures that the supply of money is instantaneously adjusted to the demand for it. Real ouput tends to achieve its full employment level under wage and price adjustment.

D.1. Demand for Money

Crucial to the monetary approach is the assumption that there exists a stable demand function for money which can be specified in terms of very few variables. These variables are assumed to be independent of the factors that influence money supply, namely the country's balance of payments position, changes in the domestic credit and other monetary policy variables affecting domestic credit.

Zecher(1976) postulates a money demand equation in the form

$$(M/P)^d = Y^{a_1} e^u / i^{a_2} \tag{II-1}$$

where

M = the nominal money balances demanded,

P = price index,

Y = real income,

i = the rate of interest, and

u = a log normally distributed stochasticdisturbance term.

Since demand for money is assumed to be homogenous of degree one in prices, equation II-1 is rewritten as

$$M^d = P\, Y^{a_1} e^u / i^{a_2} \tag{II-2}$$

D.2. Supply Of Money

The monetary approach also assumes that there exists a stable money supply process which is a function of a limited set of variables.[1] Under a fractional reserve system, this process can be stated in terms of a money supply identity

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[1] It should be noted that, as Mussa(1976) points out, a stable money supply is, in some ways, less essential to the

$$MS = m\ H \qquad \text{(II-3)}$$

where

MS = the nominal stock of domestic money,

m = money multiplier, and

H = stock of high-powered money.

The stock of high-powered money (domestic monetary base) consists of domestic credit (DC) created by the monetary authorities and the domestic currency value of international reserves (IR) held by the consolidated banking system. Therefore,

$$H = IR + DC \qquad \text{(II-4)}$$

Substituting equation II-4 into II-3 gives the money supply formula

$$MS = m\ (IR + DC) \qquad \text{(II-5)}$$

By assuming that the supply of money is adjusted to the demand for money within the time span of the unit observation, the equilibrium in money market can be written as

$$m\ (IR + DC) = P\ Y^{a_1}\ e^{u} / \ i^{a_2}$$

or,

$$m\ (IR/H + DC/H)\ H = P\ Y^{a_1}\ e^{u} / \ i^{a_2} \qquad \text{(II-6)}$$

Since we are interested in percentage changes in the variables, a transformation of equation (II-6) is necessary.

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[1] (cont'd) monetary approach than is a stable money demand function. Since the focus of the analysis is usually on the policy choices which are open to the monetary authorities, the domestic components of the monetary base which deal with the behavior of the monetary authorities need not be stable (See Mussa, 1976, pp. 191-192).

Writing equation II-6 in log linear form and then differentiating with respect to time gives the following reserve-flow equation

$$(IR/H)\ \Delta\log(IR) = a_1\Delta\log(Y) - a_2\Delta\log(i) + \Delta\log(P) - \Delta\log(m) - DC/H\ \Delta\log(DC) + \Delta u \quad \text{(II-7)}$$

where Δ is a first difference operator.

Equations II-1 through II-7 represent the basic structure of the monetary approach to balance of payments determination. Equation II-7 is referred to as the standard reserve-flow equation that has been used to test hypotheses of the monetary approach to balance of payments. Writing reserve flow equation II-7 in its estimating form

$$\begin{aligned}(IR/H)\ \Delta\log(IR) &= a_1\Delta\log(Y) + a_2\Delta\log(i) + a_3\Delta\log(P) \\ &\quad + a_4\Delta\log(m) + a_5(DC/H)\Delta\log(DC) + \Delta u \\ &\quad a_1,\ a_3>0;\ a_2<0\ ;\ a_4 = a_5 = -1\end{aligned} \quad \text{(II-8)}$$

The coefficient a_1 is the income elasticity of demand for money which is expected to be positive and in the neighbourhood of unity.

According to equation II-8 an increase in the rate of growth of real income, other things being equal, improves the overall balance of payments. Given the value of price, interest rate, money multiplier, and the domestic credit, an increase in the rate of growth of real income increases the public demand for money which can only be satisfied by a decrease in expenditures on goods (including imports) and assets. An increase in the rate of inflation is also hypothesized to improve the overall balance of payments. For a given value of real inome, interest rate, money multiplier, and domestic credit, an increase in the rate of inflation increases the public demand for money as the rise in the rate of inflation reduces their real cash balances. Both of these monetary propositions are diametrically opposed to the income/absorption propositions according to which an increase in economic growth and the rate of inflation worsen the balance of payments.

Furthermore, according to the standard reserve-flow equation II-8, an increase in the interest rate, other things being equal, worsens the country's overall balance of payments. This monetary proposition also runs counter to the traditional income/absorption proposition. According to the latter an increase in the real rate of interest under a fixed exchange rate regime improves the overall balance of payments by encouraging the inflow of foreign capital. However, this monetary result, as Zecher(1976) notes, is consistent with the income/absorption result if the interest rate is viewed as a proxy for world interest rates, and changes in this interest rate are taken to reflect similar movements in rates all around the world (Zecher, 1976, p. 290.)

However, crucial to the monetary approach to the balance of payments is the quantitative relationship between the changes in domestic credit (ΔDC) and the international reserve flows (ΔIR). This relationship is measured in the empirical studies by the coefficient on ΔDC (offset coefficient) in the standard reserve-flow equation. The monetary model postulates that, for a given amount of money demanded and a given money multiplier, changes in the domestic component of the monetary base (ΔDC) will cause opposite and equal changes in international reserves (ΔIR). As long as the demand for money given by equation II-1 is reasonably stable, the estimated coefficients for m and DC are expected to approach their hypothesized values, i.e. -1.

This result of the monetary approach to balance of payments offers a policy outline that is quite straightforward for influencing the behavior of the international reserve flows. Reserves would flow out (in) if a nation's monetary authorities increase (decrease) the domestic component of the monetary base at a rate which is higher (lower) than the rate public wish to hold cash balances. This implies a complete neutralization of the monetary policy by movements in international reserves which is, however, not consistent with the traditional income/absorption approach. According to the latter approach, an increase in the money supply worsens both trade and capital accounts by lowering rate of interest and increasing real income, but not sufficiently to neutralize completely the increase in money supply.

Empirical studies have predominantly utilized the standard reserve equation II-8 to test the validity of the hypotheses of the monetary approach to the balance of payments. Before summarizing the results of these studies the following section briefly outlines the relevance of the monetary approach to developing economies.

E. Monetary Approach to the Balance of Payments and Developing Countries

Though the monetary approach was initially formulated for and applied to the western developed economies, it has recently occupied a central place in the analysis of payments problems in developing countries as well as in the formulation of their stabilization programs. In their review of monetary approach and the Third World, Rhomberg and Heller(1977) and Wilford(1979) provide several reasons for relevance of the monetary approach to the balance of payments theory to the developing economies.

i) First, the monetary approach to the balance of payments provides a quite simple framework for analysing the foreign sector of the developing countries. The new monetary approach views the balance of payments as essentially monetary and recommend an analysis in terms of behavioral relationships directly relevant to the money account or official account. These relationhips can essentially be tested by specifying a demand for money equation. By focusing directly on the relevant monetary aggregate , this approach, as Romberg and Heller note,

> eliminates the intractable problems associated with

> the estimation of numerous elasticities of international tranactions and of the parameters describing their interpendence, which are inherent in other approaches (Rhomberg and Heller 1977, p. 4)

Moreover, the simplicity of the monetary approach to applied research and background work for policy discussion makes the monetary model of the balance of payments more appropriate for the developing countries where the data on monetary variables are often more readily available than are the data required by other approaches.

ii) Secondly, the monetary approach framework is also appropriate for the developing nations where their economies are generally characterized by a relatively high degree of openness and where the asset markets in general and markets for government securities in particular are not well developed. Under such an environment the monetary authorities, as the ultimate source of domestic money, control the rate of the domestic component of the monetary base and thereby the flow supply of money. This, according to the monetary approach

> places principal responsibility for orderly growth with a developing country's central bank monetary planners, who cannot take a passive position on the matter of expenditure policy goals of government (Wilford, 1978, p. 104)

The interrelationship between the balance of payments and monetary policy is further reinforced by the absence of a well developed assets market and financial instruments in the developing economies where the public portfolio balances consist predominantly of cash balances and physical asets. In these circumstances, the simplification for the external balance of a difference between the amount of money newly supplied through domestic credit and the additional amount that residents wish to hold is, as Rhomberg and Heller note, "more obtrusive that it is in countries with a more complex financial structure" (Rhomberg and Heller, 1977, p. 7).

iii) Thirdly, foreign reserve flows are hypothesized by the monetary models of the balance of payments to be positively related to the rate of economic growth. This has several implications for savings and foreign exchange constraints which are more often referred to as the mainstay of slow economic growth in the developing countries. Since many LDCs rely heavily on importation of industrial raw material, capital goods, and technology to carry out their industrial development, the shortage of foreign exchange could impede the economic growth in these countries even if there are adequate domestic savings. However, according to the monetary approach, the foreign exchange constraint may be less severe if the economic growth is accompanied by a stable monetary policy which brings about inflows of foreign reserves needed to finance the trade account deficit.[2]

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[2] It should be noted that this argument does not consider problems associated with excessive degree of foreign ownership , rapid growth of foreign debt, and more importantly the debt servicing. The recent experience of Brazil, Mexico, and other LDCs with a relatively large foreign debt clearly indicates difficulties faced by these

F. Empirical Evidences

Recently there has been a number of attempts to test empirically the monetary approach to the balance of payments hypotheses in the context of LDCs. Though the specification of these monetary models varies from study to study, they all yield similar testing hypotheses to the standard reserve-flow equation II-8. Without the loss of generality these studies can be classified into two distinctive groups, namely short-run and long-run analyses of the balance of payments. The long-run models use the standard-reserve-flow equation II-8 to examine the behavior of the balance of payments. In contrast, the short-run models specify a simultaneous equation system which allows for prices, real income and the domestic credit to be determined within the model.

Empirical testing of the monetary approach, like any other theory, may be conducted at two different levels; (a) testing of the validity of the economic structure (assumptions) implied by the model; and (b) testing of the accuracy of its predictions. Since the empirical studies of the monetary approach to the developing economies has mainly been conducted at the (b) level with rare exception at the (a) level, we summarize the results of studies concerning the predictive power of the monetary approach in the context of LDCs.

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[2] (cont'd) countries to service their debt.

F.1. Long-run Models of the Balance of Payments

The standard reserve-flow equation provides two sets of testing hypotheses. The first set of hypotheses relate to the impact of demand for money and its arguments and their changes on the international reserve flows. The second set of hypotheses relate to the impact of changes of the money multiplier and of the domestic component of the monetary base on the international reserve flows.

Changes in Demand for Money and the Balance of Payments

As far as the effect of the changes in demand for money and its arguments on the movements of international reserves is concerned, these studies invariably support the monetary approach hypotheses. Wilford and Zecher(1979) test the standard reserve-flow equation on Mexico data for the period 1955-1977. The price and income elasticities of the demand for money are found to be positive and not significantly different from their theoretical values, i.e. unity. The same results are reported by Wilford and Wilford (1978) and Wilford(1977), who test the standard reserve-flow equation over the Hondouran annual data (1950-1974) and Mexican annual data (1954-1974) respectively.

Aghevli and Khan(1977) apply the standard reserve-flow equation to a cross-sectional sample of thirty-nine developing countries. Two sets of estimates of the price and income elasticities of the demand for money are reported. In one set, the estimates of price and income elasticities are obtained directly by estimating the demand for money equation for the countries under study. These estimates are then utilized in the standard reserve-flow equation to obtain an estimate of the international reserve flows. In the second set, the estimates of price and income elasticities are obtained by estimating directly the standard reserve-flow equation. The price and income elasticities of the demand for money are found to have the correct signs, but they are, in both cases, significantly different from their expected values. The estimated price elasticity ranges between 0.23 - 0.56 which clearly rejects the assumption of homogeneity in prices. The estimated income elasticity of demand for money is found to be statistically significant, but its magnitude varies in the two sets. The direct estimate of income elasticity via the demand for money produces a relatively large estimate of income elasticity (2.4), which is significantly different from +1. To some extent, as Aghevli and Khan note,

> this is to be expected for developing economies, since the public holds most of its savings in money form, owing to the absence of alternative financial assets. Insofar as savings increase more than proportionately with economic growth, the estimated income elasticity will exceed unity (Aghevli and Khan, 1977, p. 282).

Furthermore, their study indicates that it is better to estimate the standard reserve-flow equation directly than to follow the two-step procedures of first estimating a demand for money equation and then substituting the estimates into the standard reserve-flow equation. The former method of testing tends to give a higher R^2 and equation estimates and the simulation results are closer to their expected and actual values respectively.

Changes in Domestic Credit and the Balance of Payments

Crucial to the monetary approach to the balance of payments is the postulate that under a fixed exchange rate regime and small country assumptions, changes in domestic credit will cause opposite and equal changes in the international reserves. This hypothesis, like other hypotheses of the monetary approach, has been tested with the tools of hypothesis testing of classical statistics. Therefore the monetary approach hypothesis that the offset coefficient = -1 is tested against the alternative hypothesis that $a_5 > -1$. The latter hypothesis is consistent with the income/absorption approaches to the balance of payments. According to the income/absorption hypothesis, as pointed out earlier, all increases in money supply do not leak out in the balance of payments as postulated by the monetary approach. As such, the hypothesis testing of classical statistics, as Kreinin and Officer(1978) note "may be incapable of discriminating between the monetary and non-monetary theories" (Kreinin and Officer, 1978, p. 57). If the monetary approach hypothesis can not be rejected, it is likely that the income/absorption approach hypothesis also can not be rejected.

The empirical results of estimating offset coefficients are mixed. The Aghevli and Khan's study(1977a) produces an offset coefficient which is significantly different from unity. This would imply that "all increase in this variable (domestic component of the monetary base) would not leak out in the balance of payments" (Aghevli and Khan, 1977a, p. 284.) This suggests that, as they point out, that some of the assumptions underlying the monetary model are not satisfied. For example, to the extent that prices rise in response to an increase in the domestic component of the monetary base it would reduce the effect on the balance of payments.

In a study on the balance of payments of Panama, Barts and Hanson(1979) actually test the monetary approach hypothesis that the domestic prices move in proportion to international prices and that domestic credit expansion has no effect on the rate of change of prices. Their results clearly indicate that,

> even in an economy as open as Panama foreign and local prices do not move proportionally, as the simple (monetary) model would predict, and that domestic credit does influence the local price level, contrary to the simple model (Barts and Hanson, 1979, p.278).

Barts and Hanson construct a two-equation simultaneous model; one explains the behavior of the international reserve flows and the other the behavior of prices of home goods (non-traded goods). The balance of payments equation relates the international reserve flows variable as dependent variable to prices of home goods, export gooods, and of import goods, and the nominal stock of money supply lagged one period. In turn, the price of home goods is specified as a function of the price of export goods, international reserve flows, and the nominal stock of money supply lagged one period. Barts and Hanson test both the standard reserve-flow equation and the extended monetary model over the Panamanian annual data for the period 1953-1974. Their results suggest that the extended model, involving the simultaneous determinant of reserve loss and the price level, is more appropriate than the single monetary model.

However, the Wilford and Zecher' study(1978) and Wilford's study(1977) of the Mexican balance of payments experience and Wilford's study(1977) of the Hondouran balance of payments experience provide supporting evidence in favor of the monetary approach hypothesis. In all these studies, the offset coefficient is found to be not significantly different from its theoretical value (-1).

Among these studies Wilford's study(1977) is unique in specifying and testing "fiscal policy offset variables". In addition to testing the standard reserve-flow equation on the Mexican annual data for the period 1954-1977, Wilford also tests a modified standard reserve-flow equation in which domestic credit variable is replaced by the following identity

$$\Delta DC = y_g - t - i_b$$

where the sources of government funds, including taxes (t) and the government net issuance of debt (i_b), are subtracted from government expenditures (y_g). The remainder, then, represents the treasury financing requirements or the the government borrowing from the central bank to finance its deficit. Incorporating this identity into the standard reserve-flow equation II-7, it yields

$$\begin{aligned}(IR/H)\ \Delta\log(IR) = {} & a_1\Delta\log(Y) - a_2\Delta\log(i) + \Delta\log(P) \\ & - \Delta\log(m) - \log(y_g/H) + \log(t/H) \\ & + \log(i_b/H) + u \qquad \text{(II-9)}\end{aligned}$$

Equation II-9 represents an alternative specification of the single monetary model where domestic credit is broken into its base components. The estimating form of equation II-9 may be written as

$$\begin{aligned}(IR/H)\ \Delta\log(IR) = {} & a_1\Delta\log(Y) + a_2\Delta\log(i\ ) + a_3\Delta\log(P) \\ & + a_4\Delta\log(m) + a_5\log(y_g/H) \\ & + a_6\log(t/H) + a_7\log(i_b) + u \qquad \text{(II-10)}\end{aligned}$$

The size and sign of a_1, a_2, and a_3 are again as anticipated for the standard reserve-flow equation. However, as Wilford notes, there is no a priori information available concerning the coefficients a_5, a_6, and a_7 because y_g, t and i_b are arithmetically related to DC and hence to IR. Nonetheless, one expects coefficients a_5 and a_7 to be positive and a_6 negative. An increase in government expenditures, *ceteris paribus*, will increase the central bank claims on the government and hence domestic credit which in turn results in an outflow of foreign reserves. In contrast, an increase in government tax revenue or domestic borrowings will result in an inflow of foreign reserves as the reduction in treasury financing requirements lowers the domestic credit. An increase in domestic credit, as Wiford points out, has also a positive effect on reserves as it decreases the liqidity available for the private sector.

Wilford tests both equations II-8 and II-10 over the Mexican data. The results confirm the monetary approach hypotheses and the offset coefficients of both monetary policy variable DC and fiscal policy variables y_g, t, i_b, turn out to have their correct signs and their values correspond to their theoretical values.

However, it should be noted that the generality of these results obtained from the Mexican experience, as Kreinin and Officer(1978) observe, might be questioned, given the openness of the Mexican economy in relation to the United States.

F.2. Shortcomings and Inadequacies of the Standard Reserve-Flow Equation

Though the general principles of monetary models of balance of payments are much broader than the other traditional models, it is acknowledged both by proponents and critics of the monetary approach that the apparent simplicity of the monetary approach might be somewhat deceptive. In an introductory survey to the monetary approach to the balance of payments theory, Rhomberg and Heller(1977) write,

> even though for many purposes the demand for money can be conveniently expressed as a function of a small number of variables, it is still just as much the resultant of the influences that come to bear on the economy as are national income and national expenditures.... These considerations do not invalidate the monetary approach; they merely draw attention to the possibility that it will be seen, on further examination, to be not quite so superior in terms of simplicity of application as had first been thought(Rhomberg and Heller, 1977, p. 4).

Since it is beyond the scope of this study to provide an exhaustive review of shortcomings and inadequacies of the single-equation monetary model of the balance of payments, instead the focus will be on those aspects of monetary models which this study attempts to make some improvements.

1. Methodological and Statistical Problems

It is contended, by Kreinin and Officer(1978), Helliwell(1980), and Frenkel, Gylfason, and Helliwell(1980), among others, that there are several problems inherent in the single equation monetary model which make it difficult to provide a meaningful interpretation of the estimates of parameters of the model and more importantly to discriminate between the 'monetary' and 'Keynesian' hypotheses.

The standard reserve-flow equation is, as Helliwell(1980) put it,

> nothing more than a demand-for-money equation combined with an identity, and as such its coefficient can not help at all to discriminate between monetary and non-monetary approaches to the balance of payments (Helliwell, 1980, P. 304.)

In any model with a correctly specified demand for money equation, as Frenkel and et al.(1980) demonstrate, the estimate of offset coefficient a_2 should be equal to -1. The partial effect of domestic credit on the international reserve flows (the offset coefficient) would be still -1 for any model in which an increase in domestic monetary base had a big effect on the output, price and interest rate, for a given value of real income, price, and interest rate.

To demonstrate this, consider the estimating form of the standard reserve-flow equation II-8. From the money supply identity II-4 and the demand-equation for money II-2

$$a_4 = a_5 = -1$$

By making a simple rearrangement the standard reserve-flow equation II-8 can be written as

$$(IR/H)\ \Delta\log(IR) + \Delta\log(m) + (DC/H)\ \Delta\ \log(DC) = \Delta\log(M)$$

$$a_1\Delta\log(Y) + a_2\Delta\log(i) + a_3\Delta\log(P) \qquad (II\text{-}11)$$

which is an ordinary demand for money equation expressed in logarithmic first difference. If the money demand equation II-11 is not misspecified and fits the data exactly, it would then continue to fit exactly even though equation II-11 is rearranged into its original form (equation II-8). The estimate of a_5 would then be equal to -1. However, if the money demand equation does not fit data exactly, the estimate of a_5 in the reserve-flow equation II-8 might not be equal to -1, but an estimate of -1. These suggest that the estimate of offset coefficient a_5 in the standard reserve-flow equation is not an estimate of the true reduced form effect of changes in domestic monetary base (ΔDC) on the international reserve flows (ΔIR). It reflects only the partial effect of ΔDC on ΔIR for a given price, real income, and interest rate. Thus, as Frenkel, Gylfason and Helliwell conclude

> in any model with a correctly specified demand for money equation, the estimates a_5 should be equal to -1; in a model in which credit expansion had a big effect on prices, output, or the rate of interest, the partial effect a_5 would still be -1, for *given* values of P, Y and i (p. 494.)

In addition to the methodological problems the estimated offset coefficient suffers from simultaneity problem. The estimated offset coefficient, as our survey of empirical studies indicates, is frequently obtained by applying ordinary least squares (OLS) to the standard reserve-flow equation. This is based, among others, on the assumption that variations in the domestic component of the monetary base (ΔDC) in equation II-7 or of Y , t and i in equation II-10 are independent of the changes in the international reserve flows. That is the monetary authorities do not get involved in any sterilization activities to neutralize the consequences of balance of payments surpluses/deficits on the domestic monetary base. However, if this assumption was not met the use of OLS to estimate offset coefficient would involve a simultaneous-equation bias. Kouri and Porter (1974, Pp. 453-454) demonstrate that in the presence of sterilization the OLS estimate of the offset coefficient is biased in an upward direction in absolute value.[3] As such, the estimated offset coefficient tends to favor the monetary approach hypothesis.

The OLS estimate of the offset coefficient also suffers from another source of simultaneous-equations bias. Consider the monetary-base identity II-4

$$H = IR + DC$$

Writing this identity in first difference form and solving forΔ IR, one obtains

$$\Delta IR = \Delta H - \Delta DC$$

which states that for a given monetary base ($\Delta H = 0$) a change in DC results in an opposite and equal change in IR. This definitional relationship between IR and DC is ignored in the OLS estimation of standard reserve-flow equation.

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[3] For an intuitive proof, see Magee (1976, p. 165).

This tends to bias the estimated offset coefficient toward unity from either direction.

2. Rigid Assumptions

The single equation monetary model of the balance of payments is based on several assumptions which appear to be too rigid in the context of developing countries.

The Long-run and Short-run

In the long-run equilibrium of the monetary approach , monetary aspects are generally regarded as the core and essence of the mechanism in the process of adjustment at the expense of nearly exclusion of "real" factors. The latter are often postulated to be determined exogenously. As a result, the new monetary theory is regarded, as Kreinin and Officer(1978) point out, not only as an extension of domestic monetarism but also as a complete substitute for the traditional balance of payments theories.

Furthermore, little or no attempt has been made to marry the new monetary and traditional approaches to the balance of payments in the short-run which is characterized by variations in output, employment and relative prices and which the policy makers are more concerned. Instead, the monetary approach hypotheses are tested in isolation. Indeed, Frenkel, Gylfason and Helliwell(1980) demonstrate the potential difficulties of interpreting the results of empirical tests set up within a too restrictive context. They also emphasize the danger of adopting either a

Keyenesian approach or monetary approach in the short-run and long-run.

To demonstrate this shortcoming of the single monetary or Keynesian model of balance of payments Frenkel and et al. construct a simple short-run general model which synthesized the Keynesian and monetary approaches to the balance of payments theory in such a way that (a) the monetary approach and the Keyensian approach are fully consistent with each other, (b) monetary and Keynesian hypotheses based on more partial models may be handled as a special case. The synthesized model consists of five behavioral equations, expressing equilibrium condition in the commodity and money markets (IS and LM equations), an aggregate supply, and two balance of payments equations. The balance of payments is defined on current and capital accounts along the Keynesian approach, as well as on the official settlement account. These equations, after various substitutions, are reduced to the following two equations

$$IR = \overset{-}{k}_1 Y + \overset{+}{k}_2 G + \overset{+}{k}_3 R + IR_{-1} \quad \text{(K-schedule)}$$

$$IR = \overset{+}{m}_1 Y + \overset{-}{m}_2 G + \overset{-}{m}_3 R - DC \quad \text{(M-schedule)}$$

where G denotes government expenditures, R exchange rate and other variables are defined as before. The expected direction of change for each dependent variable with respect to the independent variables are denoted by signs ± .In contrast to the single monetary models (equations II-8, II-9 and II-10) the coefficients of income (k_1 and m_1) in the above two equations reflect not only the effects of changes in income on the trade balance and demand for money respectively but also the price and the interest rate effects.

Figure II-1. The K-schedule and M-schedule.

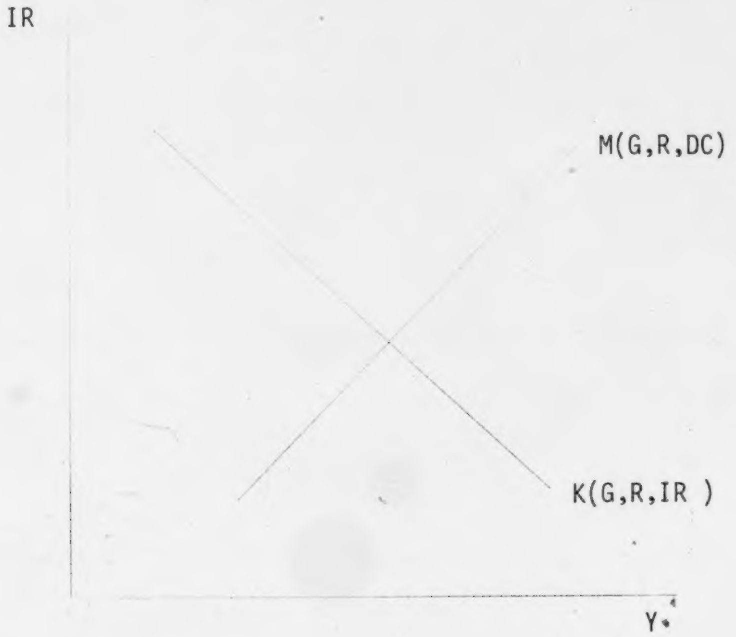

Figure II-1 shows how potentially misleading it is to regress IR on Y to see the two are positively related, as predicted by the single monetary model, or negatively related, as predicted by the Keyenesian model.

According to equations II-12 and II-13 international reserve flows can positively or negatively be associated with changes in output depending on what policy variable is changed and also the slopes of the K-schedule and M-schedule. For example, a rise in the government expenditures shifts both the K-schedule and M-schedule to the right and increases income and improves or worsens the balance of payments depending on the relative slopes of the two schedules.

Credit Creation and the Government Budget Constraint

In the monetary model of the balance of payments domestic credit is taken to be an exogenous variable under the control of the monetary authorities. Changes in the policy variable DC is then assumed to be independent of the changes in demand for money or changes in its arguments, and the country's balance of payments position (i.e. absence of sterilization). These assumptions avoid the reverse causation between the right hand variables of the standard reserve-flow equation and the international reserve flows.

These assumptions appear to be too rigid, especially in the context of developing economies, at least for two reasons. First, developing economies are typically less diversified than developed economies and output, employment and prices tend to be more subject to fluctuations in the external sector of the developing economies than those of developed economies. The export list of many developing economies is dominated by few primary products whose volume and prices often vary with climatic conditions and world prices. These economies also import a substantial proportion of the industrial raw materials and capital goods for which there are no domestic substitutes. Under such circumstances, shortages of imported raw materials and capital goods often interrupt domestic production with the result of a widespread shortages of basic consumer items as well as a substantial tax revenue loss to the treasury. The foreign sector also plays a crucial role in determining the government revenue. Taxes on foreign trade more often account for a relatively large proportion of total government revenue (see chapter III).

Second, in the absence of a well developed asset market the government tends to rely more heavily on borrowing from the central bank to finance its deficit. The distinction between fiscal and monetary policies are often blurred as the latter are broadened to include the fiscal policies. Consequently, fluctuations in the country's balance of payments have not only destabilizing effects on the supply of output but also on the money supply. A reduction in country's foreign exchange earnings might not only retard the growth of output but it might also reduce government tax revenues and thereby raise the treasury financing requirements.

Omission of government budget constraint from the single monetary model has also other consequences to the analysis of monetary approach. The monetary appproach tends, as Currie (1976) notes, to overlook the fact that sterilization can be affected by running a government budget surplus/deficit. In the presence of a government budget constraint, domestic credit is likely to be affected by factors that are usually regarded as non-monetary such as tariff, devaluation and other factors which directly or indirectly influence government revenues and expenditures.

These shortcomings and inadequacies of the single monetary equation tend to suggest the need for a simultaneous macroeconomic model which endogenize output and prices and takes account of simultaneity between (a) changes in domestic credit and the international reserves, and (b) changes in domestic credit and the government budgetary position.

F.3. Short-run Monetary Models of the Balance of Payments

Recently, several attempts have been made to develop a short-run monetary model of the balance of payments which take into account some of the shortcomings and inadequacies of the single-equation monetary models (Khan 1976 and 1977; Miller and Askin, 1978; Aghevli and Khan, 1980; Khan and Knight, 1981 and 1982).

In a study on monetary policy and the balance of payments in Brazil and Chile, Miller and Askin(1978) extend the standard reserve-flow equation by incorporating a monetary policy reaction function into the monetary model. In contrast to the studies surveyed above, Miller and Askin relax the standard monetary approach asumption that no sterilization takes place on the part of the monetary authorities. This allows them to investigate both (a) to what extent variations in the domestic component of the monetary base are offset via international payments imbalances and (b) to what extent the monetary authorities sterilize the effects of payments imbalances on the monetary base.

To achieve these objectives, they construct a highly aggregated macroeconomic model which takes account of the simultaneity between changes in the international reserves, income and the monetary base. Their model consists of four behavioral equations; three equations representing equilibrium conditions in the commodity, money , and foreign exchange markets and one central bank reaction function. The central bank reaction function relates the domestic component of the monetary base to two domestic monetary target variables, namely, the level of income, a time trend, and the stock of international reserves as a foreign monetary target variable. The model is estimated over the Brazilian and Chilean annual data for the period 1955-1971. The estimated offset coefficients are found to be as low as -0.18 for Brazil and -0.29 for Chile and statistically significant. Both countries also appear to sterilize fully the effects of payments imbalances. The sterilization coefficient ($\Delta DC/\Delta IR$) is found to be significantly different from zero for both countries and not significantly different from -1. Therefore, Miller and Askin conclude, "even if their exchange rate had remained constant, Brazil and Chile would have had almost complete control over their money supplies, as long as they were able to finance a payment deficit,"(p. 237.) These results are consistent with other results reported for developed countries. The results of estimating sterilization coefficients for developed countries, as Kreinin and Officer's survey (1978) indicates, uniformly favor the income/absorption approach and run counter to the monetary approach to the balance of payments.

Khan(1976) and more recently Aghevli and Khan(1980), Khan and Knight(1981 and 1982), and Aghevli and Sassanpour(1982) have extended the long-run single-equation monetary model by constructing a relatively simple short-run macroeconomic model. These models generally explain the short-run fluctuations in balance of payments, prices, and the output while maintaining the long-run predictions of the monetary approach as characteristics of their steady-state solution.

With the exception of the Khan and Knight(1981, and 1982)' studies, these studies decompose the balance of payments into trade and capital accounts and examine the behavior of each individual account. The balance of payments is equal to the excess (or deficit) of the economy's flow of production over its flow of absorption. However, in contrast to the income/absorption approach, these studies incorporate into their model one aspect of the adjustment that the monetary approach specifies. Balance of payments surpluses/deficits are regarded as transitory, reflecting a stock adjustment flow. More importantly, these studies explicitly explain the process of adjustment whereby changes in exogenous variables cause divergence between income and expenditures.

Khan(1976) designs a relatively simple macroeconomic model, consisting of seven stochastic equations. These equations explain the behavior of imports, real expenditures, the rate of inflation, the currency to deposit ratio, the domestic rate of interest, short-run capital flows, and the excess reserves to deposits ratio of the commercial banks. The model is applied to the Venezuelan economy for the period 1968-1973. The results appeared to be quite satisfactory, both in terms of the estimates of structural equations as well as its ability to track the behavior of key macroeconomic variables.

In a study of eight developing countries Aghevli and Khan(1980) construct and estimate a short-run macroeconomic model of balance of payments which is more or less similar the Khan(1976)'s model of the Venezuelan economy. Their results indicate the importance of both monetary and real factors in the process of balance of payments adjustment. More especifically, it was found that

> the actual discretionary (monetary) policy followed by the respective government authorities resulted in a generally higher inflation rate and somewhat worse balance of payments..., but with a better growth performance, than if they had followed a simple role

> and allowed the domestic credit component of the money stock to grow by a constant percentage per annum (Aghevli and Khan, 1980, p. 704.)

This result clearly indicates possible trade-offs that governments face when they pursue monetary policy; assigning the major importance to the achievement of equilibrium in the foreign sector, may be simultaneously consistent with lower rate of inflation, but this is not without its own cost, having lower rate of growth of real income.

Though these studies explicitly examine the interaction between monetary and real factors by endogenizing prices and output, there has been little attempt to incorporate fiscal and monetary operations. Indeed, in the Khan(1976)'s model and Aghevli and Khan(1980)' model domestic credit DC is assumed to be exogenouly determined outside the model and government expenditures are included in the private expenditures. The aggregation of the government expenditures with the private expenditures, as Khan points out, is based on an implicit assumption that the fiscal authorities are constrained in their deficit financing by the monetary authorities(Khan, 1976, p.248). Though this assumption might be justifiable in the context of the Venezelan econmoy, however, it appears to be quite restrictive in the context of many other LDCs such as Tanzania.(see chapter III)

In a study on the stabilization programs in developing countries Khan and Knight(1981 and 1982) develop a short-run macroeconomic model in which variations in prices and output are allowed to describe the short-run behavior of the balance of payments. The balance of payments is defined on the official account and both fiscal and monetary variables are endogenized. Both nominal government expenditures and revenues are hypothesized to vary directly with nominal income and their corresponding lagged values; and changes in domestic credit are explained by the following identity

$$\Delta DC = \Delta CG + \Delta CP \qquad \text{(II-13)}$$

where ΔDC represents changes in domestic credit, ΔCG and ΔCP changes in the banking system's claims on the government and the private sector respectively. Assuming that all changes in claims on the government are a reflection of fiscal deficits of the government, then identity II-13 can be written as

$$DC = GE - DR + \Delta CP + DC_{-1} \qquad \text{(II-14)}$$

where GE is the nominal government expenditures and DR the government domestic revenues. According to this formulation, any expansion of a fiscal deficit results in an equivalent increase in the stock of domestic credit. This implicitly assumes that

> the government finances its deficit by borrowing from the banking system, using its cash balances held with banks, or by borrowing abroad and converting the proceeds into domestic currency(Khan and Knight, 1981, p. 16.)

Though this formulation of government's fiscal and monetary operations, as suggested by Khan and Knight, might not appear to be unrealistic in the context of developing countries where asset markets are not well developed, it is not without its own shortcomings. The complete endogenization of the fiscal variables leaves no room for fiscal authorities to have any discretionary power over the course of fiscal operations. There is in fact some evidence which suggest that fiscal authorities do exercise certain discretionary power over fiscal variables (Behrman, 1978, Heller, 1980.) Furthermore, fiscal imbalances are generally influenced by a host of factors, other than nominal income (see Tanzi, 1982). The Khan and Knight's formulation of the monetary policy also seems to be quite restrictive. According to identity II-14 the only objective of the monetary authorities is to meet the treasury's financing requirements. As studies by Miller and Askin(1976) and Porzecanski(1979) clearly indicate, monetary authorities pursue other objectives (such as balance of payments, employment, and price stability) in addition to the meeting of the treasury's financial requirements.

To overcome these problems, in chapter IV we construct a short-run monetary model of the balance of payments with the following main features;

i) the model endogenizes prices and output;

ii) the interaction between the monetary and fiscal operations are explicitly formulated by specifying a central bank reaction function and a treasury financing requirements equations; and

iii) several institutional factors governing the operation of commodity, money, and the foreign exchange markets are incorporated into the specification of the behavioral equations of the model.

Before formulating a simultaneous equation system of the Tanzania's balance of payments chapter III will summarize the main characteristics of the Tanzanian economy and its performance over the period under study.

III. AN OVERVIEW OF THE TANZANIAN ECONOMY, 1962-1981

The purpose of this chapter is to describe and analyse some of the main structural features of the Tanzanian economy which are relevant to the subject matter of this study. To pursue this objective the following outline will be followed: (1)Growth and composition of the gross domestic product (GDP); (2)Balance of payments and commercial policy; (3)Financial system and monetary policy; and (4)Fiscal structure and fiscal policy.

A. General Economic Performance

In economic development literature, it is a common practice to measure the level and rate of economic development in terms of the country's level and rate of growth of per capita GDP. In this framework, Tanzania is characterized as one of the least developed countries, with a per capita GDP equivalent to U.S.$245 in 1981. The relevant statistics on the level and rate of change of GDP over the 1962-1981 period are shown in table III-1. As table III-1 shows, real GDP at 1966 prices grew from Shs.5014 million in 1962 to Shs.11149 million in 1982, at an average rate of about 4.6 percent per annum.[4] With an annual population growth rate of about 2.9 percent, this implies a real per capita income growth rate of nearly 1.7 percent per annum.

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[4] Eight Tanzanian Shillings (hereafter, Shs) are approximately equal to one US dollar.

Table III-1. Gross Domestic Product and Annual Growth Rates, 1962-1981.

Period	Gross Domestic Product(1) (Shs.million) current prices (1)	Gross Domestic Product(1) (Shs.million) 1966 prices (2)	Growth rate of (2) (%) (3)	Per capita GDP at 1966 prices (4)	GDP price deflators (1966=100) (% change) (5)	Consumer price indices (1966=100) (% change) (6)
1962	4217	4594	9.1	462	0.5	0.0
1963	4617	5014	6.4	480	4.9	-3.2
1964	5594	5617	5.4	493	-0.8	1.7
1965	5671	5775	2.8	494	2.3	6.7
1966	6514	6514	1.8	545	9.5	9.5
1967	6735	6777	4.0	553	-0.6	12.3
1968	7182	7128	5.2	566	1.4	15.3
1969	7460	7259	1.8	561	2.0	16.5
1970	8215	7680	5.8	579	4.1	4.7
1971	8857	8001	4.2	587	3.3	5.9
1972	10032	8539	6.7	610	6.8	7.6
1973	11490	8800	3.1	612	7.6	10.5
1974	14010	9020	2.5	611	22.3	19.2
1975	16988	9553	5.9	630	14.3	26.4
1976	20853	10188	6.6	654	15.3	6.9
1977	26653	10925	7.2	683	18.5	11.6
1978	29653	10989	0.6	668	11.8	11.4
1979	32396	11291	2.8	666	5.8	13.8
1980	34711	11561	2.4	662	4.6	30.3
1981	37108	11149	-3.6	618	10.9	25.7
Annual averages:						
1962-1972			5.8		2.3	7.0
1973-1974			2.8		15.0	14.8
1975-1981			3.1		12.3	17.8
1962-1981			4.6		7.1	11.6

Notes: (1) At factor costs.
Sources: Annual Economic Survey, various issues; National Account of Tanzania, 1966-1980; and World Tables.

The growth rate of real income fluctuated quite considerably over time from as little as -3.6 percent in 1981 to over 12.8 percent in 1966. The economy experienced its highest rate of economic growth during the first decade of post-independence(1962-1972). During this period, the economy grew at an annual average rate of 5.8 percent in real terms which is considerably above the growth rate of 4.4 experienced by other African developing countries(ECA, 1972). Even more remarkable, this rapid growth was achieved with relative price stability. As table III-1 indicates, the implicit GDP deflator grew at an annual average rate of 2.3 percent. The consumer price index also shows a moderate rate of inflation (about 7 percent) over the1962-1972 period as compared with the rate of inflation experienced by the economy during 1975-1981 (12.3 percent).

The rapid economic growth and the price stability of the first post-independence decade was interrupted in the years of 1973-1975 . During this period, the economy was faced with a number of internal and external shocks,(such as drought, four-fold increase in prices of oil and food grain), which brought the economy almost to a stand still. The rate of inflation as measured by the rate of change in the consumer price index jumped from 7.6 percent in 1972 to about 19 percent in 1974 and to 26.4 percent in 1975 (see table III-1).

By mid 1975, the economy started showing some signs of recovery. Two years of abnormally good weather, the coffee boom of 1976-77, and a government stabilization programme all contributed to revitalization of economic growth and price stability. In 1977, the economy recorded its highest rate of growth since 1966, 7.2 percent(see table III-1).

However, the high growth rates of the 1975-1977 period shortly turned out to be non-sustainable. With the disappearance of the coffee boom and the abnormally good weather conditions in 1978, the economy continued to experience a prolonged period of negative growth and price instability. As can be seen from table III-1, real per capita GDP declined in absolute terms over the 1978-1981 period from Shs.683 in 1977 to Shs.618 in 1981. Despite the government's price control measures, the rate of change in consumer price index rose from about 12 percent in 1977 to as high as 30.3 percent in 1980 (see table III-1).

B. Composition of Output and Pattern of Economic Growth

B.1. Primary Sector

In Tanzania, as in many other LDCs, a major proportion of national income is generated in the primary sector (see table III-2). Though the share of the primary sector in total output has been declining steadily over the time (from about 48 percent in 1964-66 to 38 percent in 1979-81), this sector has continued to be the backbone of the economy. In 1981, agriculture, as the dominant primary activity, provided means of livelihood for about 88 percent of the

TableIII-2. Sectoral Distribution of GDP, at constant 1966 prices

(percent)

Sectors	1964-66	1969-71	1976-81
Primary:	48.2	43.0	38.1
Agriculture	45.5	41.3	37.5
Mining&quarrying	2.7	1.7	1.6
Industry:	11.9	15.2	13.5
Manufacturing	7.6	9.8	7.7
Public utilities	0.9	1.2	1.8
Construction	3.7	4.3	2.4
Services:	39.5	43.2	50.3
Commerce	12.3	11.8	7.7
Transport& communication	7.7	9.5	11.0
Finance&real est.	9.6	9.8	9.8
Public admin.	11.5	12.5	20.0

Sources: See TableIII-1.

country's population, more than 75 percent of export earnings, and employed more than one-fourth of the labor force (*Annual Economic Survey*, 1981).

Despite the importance of agriculture in the Tanzanian economy,this sector has fared poorly during the period under study. As evident from table III-3, agricultural value added by the monetary sector at 1966 prices grew at an average annual rate of only 2.2 percent over the years of 1962-1981. During this period, the performance of the agricultural sector fluctuated considerably. Agricultural value added, which had grown at an average annual rate of 3.7 percent over the 1962-1972 period, stagnated over the second half of 1970s.

B.2. Industry

Tanzania's industrial sector is quite small, having contributing about 12 percent of GDP in 1964-1966, 15 percent in 1969-1971, and 13.5 percent in 1979-1981 (see table III-2). Industrial development in Tanzania is of recent origin. At independence (1961)the industrial sector was at a rudimentary stage, producing about 7 percent of country's GDP at current prices (IMF, 1967, table 1). Throughout the period under study, industry has been the major focus of development strategy pursued by the government. Industrial strategy has mainly emphasised import-substitution and to a lesser extent, the processing of primary agricultural products as a means of diversifying

TableIII-3. Sectoral Growth Rates of GDP,
at constant 1966 prices
(percent)

	Average Annual Rates		
Sectors	1962-81	1962-72	1973-81
A. Monetary:			
Primary:			
Agriculture	2.2	3.7	2.5(1)
Mining&quarrying	0.5	2.4	-4.8
Industry:	11.9	15.2	13.5
Manufacturing	4.9	10.5	-2.1
Public utilities	9.2(2)	9.2	8.9
Construction	7.1	10.0	2.4
Services:			
Commerce	3.5	5.9	0.7
Transport& communication	7.7	9.6	4.8
Finance&real est.	3.6(3)	12.6(4)	3.6
Public admin.			9.7
B. Subsistance	3.3(4)	2.8(4)	3.8

Notes:
(1). Exclude the droughts of 1973/74 and 1979/80.
(2). Excludes 1971-1972.
(3). Excludes 1962-1964.
(4). Include 1965-1972.

Sources: See TableIII-1.

Tanzania's economic base and improving its balance of trade with the rest of the world.

Manufacturing, as the most dominant industrial activity recorded its highest rate of growth during the first post independence decade, growing at an average rate of 10.5 percent at constant prices (see table III-3). Due to widespread shortages of foreign exchange in the 1973-1981 period, manufacturing lost its growth momentum. In view of the relatively high import content of industrial output, the growth rate of value added by manufacturing sector declined drastically to - 2.1 over the 1973-1981 period (see table III-3).

B.3. Services

Tanzania's service sector was one the fastest growing sectors over the entire period under study. The share of this sector in real GDP rose from about 40 percent in 1964-1966 to over 50 percent in 1979-1981 (see table III-2).

Over the period under study, all four sub-sectors of services, commerce, transportation and communication, finance and real estate, and public administration have undergone several quantitative and qualitative structural changes. Prior to the Arusha Delaration of 1967, major services such as banking, insurance, foreign trade, and domestic wholesale trade were controlled by a few large foreign corporations and a minority of well-to-do Tanzanians of Asian origin. Since 1967, one of the main objectives of the government has been to bring these services under its own control and to increase African participation. The establishment of the Bank of Tanzania (central bank) in 1966 and the nationalization of foreign-owned commercial banks in 1967 was a major attempt toward achieving these goals. As regards commerce, several steps have been taken by the government to control and regulate wholesale trade, import and exports.

As evident from table III-3, one of the major quantitative changes in the output composition of services since 1967 has been a sharp increase in the share of public administration in GDP. Public administration and other services recorded the highest rate of growth, 9.7 percent per annum, in the 1973-1981 period, raising the average annual share of the public administration and other sevices in real GDP from 12.5 percent in 1969-1971 to 20 percent in 1979-1981.

Since both agriculture and manufacturing have tended to play a crucial role in the development of the country's import and export capacity , we will briefly summarize the industrial and agricultural policies pursued by the government over the period under study. In evaluating these policies, special reference is made to the actual implications regarding the behavior of Tanzania's exports and imports.

C. Agriculture

Tanzania is predominately a nation of small farmers. Approximately, 88 percent of the population is distributed among 8000 villages, and works 2.25 million family farms. These small family farm units typically utilize quite traditional farm implements and little fertilizer in the production of both food and export crops (such as maize, cassava, coffee, tea cotton, cashew nuts, and tobacco). Large scale farming is quite insignificant and is mainly confined to raising livestock, sisal, rice, wheat, tea and, to a limited extent, coffee.

The importance of agriculture in the economic development of a developing nation has been well recognized by development economists and policy makers. Johnston and Mellor(1961) succintly summarized the important ways in which increased agricultural output and productivity in a developing economy contribute to overall economic growth in the following four propositions;

i) economic development is characterized by a substantial increase in the demand for agricultural products, and failure to expand food supplies in pace with the growth of demand can seriously impede economic growth;

ii) expansion of exports of agricultural products may be one of the most promising means of increasing income and foreign exchange earnings, particularily in the earlier stage of development;

iii) the labor force from the agricultural sector of an underdeveloped economy can and should make a net contribution to the capital required for overhead investment and expansion of secondary industry; and

iv) rising net cash incomes of the farm population may be a stimulus to industrial expansion.

The importance of rural development in general and agriculture in particular is also highighted in government pronouncements, including the Arusha Declaration of 1967, the Iringa Resolution of 1972 and successive development plans. In all these government policy statements, agriculture invariably has been singled out as the way of achieving the national goals of self-reliance and equitable distribution of income and wealth.

> From now on we shall stand upright and walk forward on our feet rather than look at the problem upside down. Industries will come and money will come but their foundation is the people and their hard work, especially in Agriculture. ... It is the responsibility of TANU (party) to see that the country produces enough food and cash crops for exports. It is the responsibility of the Government and the co-operative societies to see it that our people get the necessary tools, training and leadership in modern methods of agriculture.
> (Nyerere, 1968, p.33)

To achieve these objectives, the government made several attempts toward the institutional reorganization of agriculture. The rural population were, first voluntarily and finally forcibly, settled in *ujamma* (co-operative) villages in order improve the supply of economic and social services and to increase public involvement in the agricultural sector.

In the field of marketing, several steps were also taken in order to reduce the role of middle-men traders (mostly Asians), and to ensure the steady supply of cash crops to marketing boards and state crop authorities. The number of co-operatives increased from 857 at the time independence (1961) to 1732 by 1970 and eventually to nearly 2500 by 1976 (Wagao, 1970). These co-operatives were in 1976 replaced by state purchasing institutions. For most major export crops, one crop authority was established. It is estimated that about one-third of the existing parastatals (statutory bodies) which numbered 300 in 1980 are involved in agricultural and the related activities (IBRD,1980, p.12). In the case of food crops, attempts have been made to increase official control over marketing of major food crops.

With regard to social services, the government policy has been primarily directed towards meeting basic needs of the rural population in the areas of education, health, and drinking water supply. In fact, Tanzania is known among LDCs for achieving a shift of social services to her rural area, where the majority of the country's population lives (ILO,1978).

However, despite policy achievement in the development of social infrastucture and institutional changes, the government's commitment to the rural area has meant little in terms of actual allocation of resources to the development of economic programs in the field of agricuture. As can be seen from table III-4, the performance of agriculture, as measured by the rates of growth of agricultural value-added and the marketed output of major export crops, has been quite poor over the period under study. As table III-4 shows, there have been considerable fluctuations in the performance of agriculture, including the monetary and subsistence sub-sector. Over the entire period under study (1962-1981), the real agricultural value-added by the monetary sub-sector grew at an average annual rate of only 2 percent in comparison to a 4.1 percent rate of growth experienced by the subsistence sub-sector. Except for sisal, all other major export crops grew at average annual rates ranging between 3 and 5.3 percent in the 1962-1981 period (see table III-4).

Excluding the two exceptionally poor harvests of 1973-1974, the performance of agriculture tends to reveal two distinctive patterns of growth over the 1962-1972 and 1975-1981 period. During the first decade of post-independence(1962-1972), both monetary and subsistence sub-sectors grew at almost the same rate, 3.7 and 3.9 percent per annum respectively; and the marketed output of major export crops grew quite rapidly at average anuual

Table III-4 Measures of Agricultural Production, Growth Rates, 1962-1981.
(percent)

Annual averages	Real value added (in 1966 prices)		Marketed output of Major export crops					
	Monetary (1)	Subsistance (2)	coffee (3)	cotton (4)	sisal (5)	tea (6)	tobacco (7)	cashewnuts (8)
1962-1972(1)	3.7	3.9	10.9	9.8	-1.8	10.6	9.0	17.0
1975-1981	2.6(2)	5.5	-0.3	2.2	-8.9	4.6	0.5	-15.4
1962-1981	2.0	4.1	5.3	4.3	-4.5	7.6	4.7	3.0

Notes:

(1) Cover only the 1964-1972 period for which there are co sistant data available. It should be mentioned that data on the subsistance agriculture are only estimates and quite inaccurate (see IBRD, 1977, 1981).

(2) Excludes 1981 for which the growth rate was extremly low (about -12.2 percent).

Sorces: Col.1 and col.2 are calculated from data given in Annal Economic Survey, various issues.

Col.3 to col.8, Marketing Development Bureau, various issues.

rates of 9-10 percent(see table III-4). Performance of the monetary sub-sector deteriorated considerably in the second half of 1970s. As table III-4 shows, during this period the annual growth rate of of agricultural value added by the monetary sub-sector declined from 3.7 percent in 1962-1972 to 2.6 percent, and marketed output of major export crops declined in absolute terms.

Many reasons are cited in the literature for the poor performance of Tanzania's agriculture (Clark, 1978, Green et al., 1980, Hyden, 1980, and IBRD 1977 and 1980). These reasons often include; (i)absence of financial and material incentive needed for expansion of output,(ii)low priority of agricuture in development plans, (iii)poor management and inefficiency of crop authorities in distribution of factor inputs and the marketing of agricultural produce; and (iv)physical constraints such as land shortages and low productivity of traditional farm technology in use.

C.1. Agricultural Pricing Policy

In Tanzania, prices of all export crops and a few food crops are fixed by the government. One of the main objectives of government pricing policy has been to ensure a "fair" price for farmers' produce, while maintaining a "fair" price to the urban consummer (ILO, 1978). In the case of export crops, these objectives unambiguously translates itself into a pricing policy in which the farmer is paid the highest possible proportion of the export proceeds. In the case of food crops, prices are often determined in a rather ad hoc fashion. Commenting on agricultural pricing policy in Tanzania, Helliner wrote in 1967,

> there is ... no overall system or set of criteria to guide the pricing decision, each case is handled on an ad hoc basis. There has been little opportunity as yet to see the pricing picture as a whole or ... the priorities and principles which might guide it. As a result the pricing system is something of a hodge podge (Helliner, 1967, p.3).

Since the food crisis of the years 1974-1975, the government has periodically taken several measures to adjust agricultural prices to changes in prices of inputs and world market prices as a means of stimulating the domestic production.

However, as available evidence suggests, both net barter and income terms of trades have increasingly moved against the farmer (ILO, 1978, Ellis, 1982). According to a report prepared by the ILO mission to Tanzania, it is estimated that between 1964 and 1973, farmers' net barter terms of trade (i.e., the index of agricultural prices divided by the price of consummer goods) declined almost continously(except for 1966 and 1969), at an average annual rate of 2.8 percent; and farmers' income terms of trade (i.e., net barter terms of trade multiplied by the index of farm output) declined steadily by 2.3 percent (ILO, 1978, pp.188 and 256-259). In a recent study, Ellis (1982) found that the barter terms of trade for small farmers' marketed output fell by over 20 percent in 1970s. The decline was more rapid for export crops than for food crops. According to the Ellis's estimate the barter term of trade for export crops fell almost by one-third(Ellis, 1982, p.52).

In view of rapid rises in f.o.b. prices of major export crops (see section F) such a rapid decline in farmers' term of trade reflects mainly a higher rate of domestic inflation and a rapid increase in processing, marketing, and administrative costs of crop authorities (IBRD, 1980, and Bates, 1981). The latter costs absorbed an ever growing proportion of the export proceeds. It is estimated that the value received by the farmers as a percent of international (f.o.b.) prices, declined from 75 percent in the crop year of 1971/1972, to 57 percent in the crop year of 1973/1974, and to 46 percent in the crop year of 1976-1977 (Bates, 1981, p.141). In addition to the rapid decline in the farmers' purchasing power, shortages of basic consumer items, especially in the second half of 1970s, also seriously undermined the farmers' incentives, with the result that farmers withdrew from production of cash crops and widespread illegal trading occurred (e.g., smuggling and black marketing)(*The Economist*, 1983, p.85)

C.2. Low Priority of Agriculture in Development Plans

The crucial role of government expenditures in the process of the development of productive capacity of agriculture might be judged by specific features of the Tanzania's agriculture such as; (i)the predominance of small farm holdings which rely on extension services provided by the public institutions, (ii)official discouragement of medium and large scale private farmings (at least until very recently), and (iii)the monopsonistic power of crop authorities in the marketing of export crops. Under such circumstances, public spending on the development of agricultural programmes more likely plays a crucial role in developing the productive capacity of the sector. A regular distribution of factor inputs and extension services by the parastatal in charge could contribute considerably to the improvement of productivity of small farms, as has already been demonstrated in the case of some export crops such as tea and tobacco.

Despite the government's commitment to rural development, the available evidence suggests that this commitment has meant little in terms of actual allocation of physical and financial resources to agriculture. In analysing the pattern of public investment in Tanzania over 1964-1973 Clark(1978) concludes,

> the government was more effective in responding to the need of shifting services, than to developing economic programmes for the rural areas (p.202).

According to Clark's estimate the public spending on agriculture by ministries responsible for the rural development accounted for only about 22 percent and 18 percent of the total expenditures in the First and Second Five Year Development Plans(p.74). The share of public expenditure on agricultural programmes for small farmers was even less than reflected in above data considering the fact that a major proportion of these expenditures went to the development of state farms, parastatal ranches, and a few large settlements schemes.

Available information on the sectoral distribution of the government's current and development expenditures, and of credits extended by the banking system also suggests that agriculture has received only marginal and declining proportions of the government expenditures and credits over the period under study (see sections H and I).

C.3. Physical and Institutional Constraints

Finally, the poor performance of agriculture has been related to physical and institutional limitations imposed on the growth of agriculture, such as shortages of land in some parts of country, low productivity of the traditional farm technology in use, and inefficiency of the existing marketing system(IBRD, 1977 and 1980, Green and et al., 1980).

D. Manufacturing

At the time of independence (1961), Tanzania inherited a manufacturing sector which was at its rudimentary stage, employing only 5 percent of the labor force and accounting for only 3.6 percent of GDP (IMF, 1967). It is estimated that more than two-third of the manufacturing industries was confined to the processing of agricultural raw materials for exports and the domestic market(Stein, 1978, p.51). Other manufacturing activities were mainly confined to the production of a few consumer items such as beverages, textiles, and cigarettes. The latter were predominantly foreign owned and had little linkages with the rest of economy as they imported on average 75 percent of their inputs (Reweyemamu, 1973 ;and Perkin, 198, p.215).

To foster the process of industrialization in Tanzania, the government pursued several industrial policies which came to play a crucial role in the formation of the current industrial structure and the demand for imports.

First of all, the government made several attempts to renegotiate with Uganda and Kenya the terms and conditions surrounding Tanzania's union with the East African Common Market(EAC). The origin of EAC dates back to 1917 when free trade between Uganda and Kenya was established. Tanganyika joined the common market in stages between 1922-1927. The common market established a common tariff against the outside world and provided free movement of commodities among the member countries. It is claimed that the rapid development of interterritoral trade and inflow of foreign capital during the Second Post War period tended to benefit Kenya more than any other members (Rewyemamu, 1973). To remedy these interterritorial imbalances, a ministerial meeting was organized in Kampala in 1964. In short, it was agreed to; (i)arrange a shift in the territorial distribution of industrial production by a number of firms which operated in two or more of the countries; (ii)allocate certain major industries between the countries; and (iii)institute quotas on interterritorial trade to a country with surplus and to devise a system of inducement and allocation of industry to secure an equitable distribution of industrial development between the three countries. Though the agreement was never ratified by Kenya, an ad hoc allocation of some industries was made in 1964 which gave Tanzania electrical, radio assembly, motor tyres and tubes, aluminium foil, and circle and plain sheet. Tanzania was also authorized in 1967 to levy transfer taxes up to 50 percent of the common external tariff for a period of 8 years on products which she had the capacity to produce.

Secondly, industrialisation has been invariably singled out as one of the primary objectives of development plans. For example, the First Five Year Development plan (FYDP, 1964-1969) envisaged a radical transformation of the economic structure by reducing the share of the primary sector to 50 percent by 1970 and 39 percent by 1980, and increasing the share of industrial activities to 19.4 in 1970 and 26.7 in 1980 (FFYDP, p.98). The share of manufacturing output in GDP was projected to be 7.5 percent by 1970 and 13.3 percent by 1980. The plan also allocated 24 percent of total private and public investment to the manufacturing sector compared to 15 percent allocated to agriculture. The plan gave priority to import-substituting industries and primary processing industries which would reduce the country's dependence on imports and increase the export value of Tanzania's primary produce.

Thirdly, the government passed several by-laws and set up several parastatals to encourage the process of industrialization. The National Development Corporation was set up in 1965 with the main objective of promoting and financing alone or in partnership with the private sector those industrial projects considered to be of stategic importance for the expansion of the economy. The government also enacted a series of investment-incentive laws which provided various types of fiscal incentives and protective custom tariffs on a wide range of products.

However, a major policy shift occurred in 1967 when the industrial strategy was reoriented toward more self-reliance in which public investment was to be the main vehicle for industrial growth, and the highest priority would be attached to those industries satisfying the basic needs of the majority of Tanzanians. The self-reliant industrial strategy, as Clark(1978) noted, did not imply that no role should be played by the private sector. In fact, manufacturing is the parastatals sector where joint ventures have been most significant.[5] According to the Clark's estimate, in 1971, only about one-third of the assets in manufacturing sector belonged to firms owned completely by the government(Clark, 1978, p.126). From 1967 to 1972, the number of parastatals in the manufacturing sector rose from 13 to 43. By 1972 manufacturing parastatals accounted for about 47 percent of the manufacturing value-added, 49 percent of wage employment, and 39 percent of the total manufacturing investment(*Annual Survey of Industrial Production*).

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[5] The Central Statistical Bureau defines a parastatal as a corporation in which at least 50 percent of the equity is government owned.

As evident from table III-3, the manufacturing sector experienced its rapid rate of growth over the 1962-72 period. During this period, value added by manufacturing and handicrafts at 1966 prices grew at an average annual rate of 10.5 percent. Growth of Tanzania's manufacturing during this period, would be more impressive if handicrafts were excluded. According to the Survey of Annual Industrial Production the value-added by manufacturing industries with more than 10 employees grew at an average annual rate of 15 percent over the 1962-72 period. Though this rapid rate of growth reflects to some extent the small industrial base, it is much higher than the rate of growth experienced by African developing countries as a whole over the same period of time(ECA, 1971).

However, as table III-3 indicates, manufacturing lost its growth momentum considerably in the 1973-1981 period. With the widespread shortages of foreign exchange during this period, value-added by manufacturing declined at an average annual rate of 2.1 percent, reducing the share of manufacturing in GDP at 1966 prices from 10 percent in 1972 to as low as 5.8 percent by the end of 1981 (*Annual Economic Survey*, 1981).

Recently much has been written on the structural changes in the Tanzania's manufacturing sector(IBRD, 1977 and 1980; Clark,1978, Wangwe, 1977 and 1983; Gulhati and Sekhar, 1982; Binefeld, 1982; and Perkins, 1983). These studies have generally examined various aspects of the Tanzania's industrialisation and its shortcomings.The following section summarizes those aspects which have direct implication for the development of Tanzania's balance of payments.

D.1. Import Intensity

One of the main objectives of the industrial strategy pursued by Tanzania has been to reduce imports and improve her trade imbalances vis-a-vis the East African Community and the rest of the world. In this regard, the industrial strategy was more or less successful in replacing some of major imported consumption goods with the domestic products. As can be seen from table III-5, the share of consumer goods which stood at about47 percent in 1966 dropped to 30 percent in 1970, to 21 percent in 1976, and to 14 percent in 1980. However, as the study by Guhati and Sekhar(1983) shows this was offset by an increased reliance on imports of processed food products, wood products, furnitures and fixtures, capital goods and metal products(Gulhati and Sekhar, 1983, pp.953-954). Examining sources of growth of the manufacturing sector, Gulhati and Sekhar found that the growth of domestic demand accounted for about 96 percent of the growth of value-added by manufacturing sector, and export demand only for 5 percent. The contribution of import substitution as a source of growth of industrial value-added was found to be -1 percent, indicating an overall increase in the ratio of import to supply of total output. The import-supply ratio rose from 56.2 percent in 1965 to 56.6 percent in 1972(Gulhati and Sekhar, 1983, table A4).

This is not surprising in view of the insignificant structural changes in the sectoral distribution of industrial output among consumption, intermediate, and capital goods. As can be seen from table III-6, comsumption-goods producing industries continued to provide over one half of the total of value added produced by the manufacuring industries. Though capital-goods producing industries increased their contribution from 2 percent of the industrial output in 1966 to 8 percent in 1972 and 11 percent in 1974 Tanzania had to import a relatively large proportion of capital goods used in domestic production. In 1972, it is estimated that imports of intermediate and capital goods accounted for about 64 percent and 81 percent of total supply (defined as gross domestic output plus imports) respectively (Gulhati and Sekhar, 1983, table A.4). It should be noted that the high degree of import dependence

TableIII-5. Imports by Broad Economic Categories
(percentage of total)

	1966	1970	1976	1980
Consumer Goods(1)	47.2	29.9	20.7	15.0
Intermediate Goods(2)	33.5	40.4	49.1	39.4
Capital Goods(3)	19.1	29.6	29.6	45.3
Total Imports	100.0	100.0	100.0	100.0

Notes:
(1). Includes a proportion of passenger cars.
(2). Includes building and construction materials, spare parts and others.
(3). Includes transport equipment, machinery and other equipment.

Sources: Annual Economic Survey, Bank of Tanzania, Economic Report and Operation, various issues.

TableIII-6. Commodity Composition of the Manufacturing Output and Value Added (percent)

Main Commodity Category	1966	1969	1974	1974	1978
As % of total gross output					
Consumption goods(1)	70	65	65	56	-
Intermediate goods(2)	28	26	27	33	-
Capital Goods(3)	20	9	8	11	-
As % of value added					
Consumption goods	67	60	64	56	57
intermediate goods	29	30	29	35	35
Capital goods	4	10	6	9	8

Notes:
(1) Includes ISIC categories 3.1/32/39.
(2) Includes ISIC categories 33-37.
(3) Includes ISIC category 38.

Sources: Survey of Industrial Production and Minister of Industry's speech, as cited, in Bienefeld(1983).

of import substituting industries is not peculiar to Tanzania. The available evidence indicates that many LDCs' which followed an import-substitution industrial strategy continue to rely heavily on imports of intermediate and capital goods, especially in their early stage of industrialisation(Burton, 1970; Little, Scitovsky abd Scott, 1970; and Baer, 1972). However, Clark(1978) and Perkins(1983) provide some evidence at the individual firm level which tends to suggest that the newly established manufacturing parastatals were on average more capital intensive and more import-oriented in their use of inputs than average manufacturing firms. Comparing main characteristics of large and small manufacturing parastatals Clark found that large parastatals (defined as firms with over Shs. 50 million) which held 80 percent of manufacturing parastatals assets were often much more capital intensive, less profitable, more oriented toward the use of imported raw materials, and less export-oriented than small firms (Clark, 1978, table 47). The difference in import intensity between large parastatals and small firms, as Clark observed, reflects not only the type of industries in which large parastatals are located, but the particular approach used by parastatals to develop the industry. According to this approach,

> the fertilizer plant was not developed to use locally-available phosphates but uses mainly raw materials. The tire factory uses only imported

> synthetic rubber despite the fact that Tanzania once grew rubber. The shoe factory uses imported plastics instead of local hides to make shoes, and only local raw materials used by the brewers is water (Clark, 1978, p.129).

This brings us to anothor major shortcoming of Tanzania's industrial strategy, inappropriate choice of technology.

D.2. Choice of Technology

Given the abundance of labor and scarcity of capital in Tanzania, one would expect that a labor intensive technology is more appropriate than the existing technology in use which utilizes capital intensively. Many reasons are advanced in the literature to explain the choice for such an inappropriate technology which is also common in many other LDCs'(Stewart, 1977; Sen, 1977; and Perkins, 1983).The most commonly referred to reasons are an over valued exchange rate, distortions in factor markets, unequal distribution of income, technological determinism, bureaucratic objectives and selective criteria, and foreign aid management.

In short, preservation of an over-valued exchange rate makes imported technology, as embodied in machinery and equiptment, relatively cheap to industrialists. This is further reinforced by the existence of several distortions in the factor market such as minimum wage laws, job security legislation, and accessibility of large industrial units to official soft loans. A skewed distribution of income and wealth in favor of high income groups also tends to favor the use of imported capital intensive technology to local technology which generally produces consumer items of lower quality. Non-availability of small-scale and labor-intensive manufacturing technology is also referred as one of the primary factors for the choice of capital intensive technology by LDCs. Since LDCs rely heavily on importation of technology from developed countries their choice is often limited to available technology in use in developed countries which is capital intensive. Finally, LDCs' preference for capital intensive technology has found to be related to the nature of decision-making in public sector. In the context of Tanzania the latter factor is generally found to be one of the main reasons underlying the choice of capital-intensive technology (IBRD, 1977, Annex V; UNIDO, 1980; Parkins, 1983; and Wangwe, 1983).

The process of decision making in Tanzania's public sector generally suffers from two major weakness;

i) *Poor Planning and Budgeting.* In a recent report prepared by a United Nation Industrial Development Organisation(UNIDO) mission to Tanzania, the mission identifies as a major problem the absence of a public body which can effectively monitor and control the importation of technology to Tanzania(UNIDO, 1980). Central planning authorities (Ministry of finance and Economic planning and Parliamentary economic sub-committee) which are responsible for the approval of industrial projects often lack qualified and experienced staff capable of carrying out thorough examinations of all proposed projects. The problem is exacerbated by the absence of a detailed industrial strategy. Industrial strategy has been formulated in a very general form with little regard to choice of technology and priority of various industrial projects in the country's development plan. Consequently, in view of the existing tight foreign exchange constraints, there has been a growing tendency among planning authorities to approve projects on the basis of applicant's success in identifying a donor agency or international corporation willing to implement the project.

ii) *The built-in-bias of foreign aid.* The use of tied aid fund is generally found to cause a planning bias in favor of projects employing capital-intensive techniques and imported technology (IBRD,1980; and Perkins, 1983). These projects are generally more attractive to donors than small local projects which utilize intensively domestic inputs, and are often difficult to monitor.

Whatever the reasons for the employment of a capital-intensive and import-oriented technology are, the choice of such technology has several implications for the country's balance of payments. Firstly, for Tanzania to sustain her rapid industrial growth on the basis of her existing industrial base, the economy should be able to finance the growing import need of the manufacturing sector. In view of the national objective of self-reliance this implies that the economy should simultaneously be able to expand its productive capacity to produce exports in order to meet its growing needs for imports. This basically can be achieved by increasing the productive capacity of agriculture and re-orienting the output of the manufacturing sector toward the foreign market; and perhaps by using manufacturing technology that is less import-dependent. Considering the general vulnerability of Tanzania's export of primary products to the external factors, such as climatic conditions and state of the world market, it then becomes crucial to encourage the exports of manufactured products. This bring us to the final main shortcoming of Tanzania's industrial strategy.

D.3. Manufactured Exports

Tanzania's exports of manufactured products to EAC and the the rest of the world grew quite rapidly with the rapid industrialisation experienced by Tanzania during the 1960s. As can be seen from table III-7, the value of manufactured exports grew from an annual average of Shs.287 million in 1965-1967 to Shs.488 million in 1970-1972, raising the share of manufactured products in total exports from 16.7 percent to about 20 percent.

Due to the widespread shortages of foreign exchange during the balance of payments difficulties of 1974-1975 and subsequent years the export of manufactured products lost its growth momentum. The growth of manufactured exports was

TableIII-7. Manufactured Exports(1),(2)
(million Shillings)

Exports	Annual Averages 1965-67	1970-72	1974-76	1978-80
Total	287	385	595	760
Sisal cordages& rope and twine	14	36	115	202
Petroleum products	133(3)	156	148	141
Diamonds	182	152	159	204
Manufactured exports as % of total exports	16.7	21.2	9.3	18.3

Notes:
(1). Includes exports to EAC.
(2). SITC categories 3 to 9.
(3). Includes 1966-67.

Sources: Annual Trade Reports and Year Book of International Trade Statistics, various issues.

further undermined by the break-down of the EAC in 1977. Export of manufactured products to the EAC which, on the average, accounted for about 19 percent of the Tanzania's manufactured exports in 1966-1976 came almost to a halt in 1977 (*Annual Trade Report*).

As table III-7 shows, Tanzania's manufactured exports are basically dominated by three major products, Sisal cordage&rope and twine, petroleum products, and diamonds. Over the period 1966-1980, these three products accounted for more than two-thirds of total manufactured exports. The remaining manufactured exports are spread over a large range of small products such as textiles and garments, leather and shoes, aluminum products and batteries.

Until very recently, the industrial strategy has placed emphasis on the domestic market and little attempt has been made by planners to formulate an export strategy with regard to the manufacturing sector. In fact up to mid-1970 industrial strategy tended, as Green and et al.(1980) observe

> to contain a systematic a priori bias against pre-export processing and assume that, with the exception of firms specially oriented to the regional (then East African Community) market, export and domestic maufacturing were inherently unrelated (Green and et al., 1980, p.88).

With the generally poor performance of Tanzania's agriculture and growing shortages of foreign exchange the government has recently embarked on several trial schemes to promote manufactured exports.

E. Foreign Sector

As in many other developing countries, the foreign sector plays a crucial role in the process of economic growth in Tanzania. During the period under study, more than one-fifth of GDP originated in the foreign sector, and imports ammounted to over one-fourth of GDP (see table III-8). The importance of the foreign sector in the economic development of a developing country such as Tanzania is much more marked than is usually reflected by the size of the foreign sector. Because of the low level of industrial development in Tanzania, the country has to import a major proportion of industrial raw materials and capital goods to be used in the production of domestic output.

The foreign sector also plays a crucial role by supplementing low domestic savings. Though the flow of private capital into Tanzania has been quite insignificant during the period under study, Tanzania has been able to obtain a considerable amount of foreign aid. Official aid, both bilateral and multilateral, amounted to about 40 percent of the import bill during the 1970s (see table III-9).

The purpose of this section is to provide a short review of the main features of the Tanzania's balance of payments and commercial policies implemented during the period under study. Since in this study Tanzania's balance of payments is approached by examining items 'above the line', the following review traces the development of

TableIII-8. Size and Growth of Tanzania's Foreign Sector

(percent)

	Annual Averages				
	1962-69	1970-77	1970-77	1978-81	1962-81
Total exports as % of GDP	26.4	20.3	20.9	12.7	21.2
Total imports as % of GDP	24.5	29.8	27.8	28.3	27.4
Growth rates:					
Imports	7.2	18.6	14.7	13.0	12.6
Exports	5.9	13.1	14.6	2.5	8.2

Notes:
(1). Excludes drought years 1974 - 1975.

Sources: Annual Economic Survey, various issues.

various accounts of the Tanzania's balance of payments over the 1962-1981 period.

E.1. Balance of Payments

The main items in Tanzania's balance of payments over the 1962-1981 period are set out in table III-9 and figure III-1.

It is evident that the structure of Tanzania's balance of payments has undergone three significant changes during the period under study. The first, and the most crucial, is that balances on trade and current accounts have increasingly moved into deficit. The second striking feature of Tanzania's balance of payments has been the increased reliance on foreign loans and grants to finance growing trade gaps. And lastly there has been an increase in the frequency and depth of trade cycles.

Current Account

Except for a small deficit on the current account in 1962, a favorable balance prevailed throughout the 1960s (see table III-9 and figure III-1). This was achieved mainly as the result of a more or less favorable trade account. As evident from figure III-1, balances on services were in deficit until 1966 and showed little improvement in the second half of the 1960s. During this period net transfers were positive though quite small.

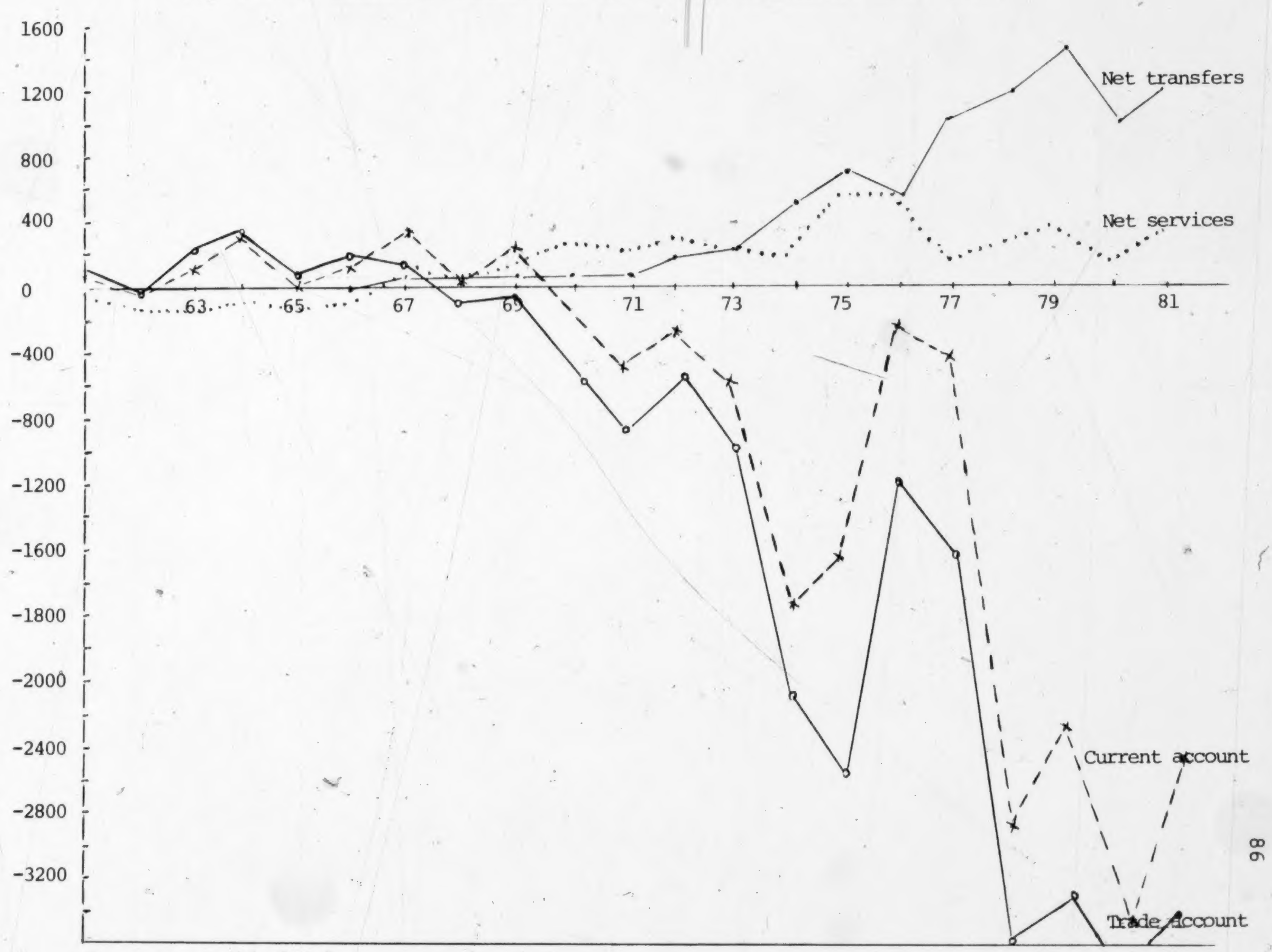
Table III-9. Main Items of Balance of Payments, 1962-1981.
(Shs.million)

	Merchandise Trade(1)			Services	Transfers(net)		Current	Capital account(net)			Overall
	Exports	Imports	Net	Net	Privte(2)	Govt.	account	Govt.(3)	Parastatals(3)	Private(3)	Balances
1962	1172	1198	26	103	18	80	67	62	10	-	38
1963	1429	1228	201	120	2	42	125	28	8	-	63
1964	1609	1262	347	66	4	18	303	104	40	-	8
1965	1476	1410	66	94	-	33	5	142	63	-	26
1966	1890	1695	195	86	7	17	100	51	124	-	161
1967	1797	1638	159	71	27	22	282	154	79	-	163
1968	1719	1834	115	61	61	5	12	179	-	-	42
1969	1757	1710	47	177	55	20	206	138	58	17	163
1970	1797	2274	477	226	79	13	159	502	55	1	43
1971	1913	2726	813	209	27	18	559	920	106	15	143
1972	2313	2883	570	256	104	74	344	821	44	7	507
1973	2581	3479	898	190	101	135	673	991	69	11	250
1974	2878	5377	2499	182	81	413	1966	698	160	15	1023
1975	2764	5709	2945	481	85	655	1705	1091	210	2	186
1976	4108	5355	1247	466	97	367	317	831	55	1	156
1977	4464	6161	1697	156	162	800	580	723	150	38	992
1978	3671	8798	5127	210	176	1096	3645	765	378	57	1947
1979	4484	9073	4589	306	241	1205	2837	1196	240	3	1512
1980	4166	10308	6142	156	181	875	4931	1002	279	11	1285
1981	4697	9550	4853	333	202	1074	3245	1271	518	7	26

Notes:
(1) Exports and imports are measured in terms of f.o.b and c.i.f. values respectively.
(2) Includes also parastatals.
(3) Includes medidum and long-term loans.

Sources: Bank of Tanzania, Economic and Operation Reports; and Balance of Payments Statistics, International Monetary Fund, various issues.

FigureIII-1. Tanzania's Trade Account and its Main Components, 1961 - 1981.



Source: see table III-9.

As can be seen from figure III-1, the trade account deteriorated rapidly in the 1970s. During this period, trade deficits fluctuated considerably along a rapidly declining trend. The size of the trade deficit during the first balance of payments mini crisis of 1970-1971, which stood at Shs.813 million or 8.3 percent GDP at current market prices, rose from Shs.2945 million or 15.5 percent of GDP during the first major balance of payments crisis of 1974-1975, to Shs.5122 million in 1978, and to its largest size, Shs.6142 million or 15 percent of GDP in 1980.

This widening gap between exports and imports throughout 1970s reflects mainly the poor performance of exports rather than the rapid growth of imports. Except for the drought period of 1974-1975 when government had to import a considerable amount of food grains, the growth of imports was quite moderate(table III-8). As table III-8 shows, imports grew at an average annual rate of about 14 percent, over the 1970s period, raising the average share of imports in GDP from 24.6 percent in 1962-1969 to about 28 percent in the 1970s. In contrast to imports, exports lagged far behind the growth of GDP and imports. The average annual share of exports in GDP declined steadily from its highest level 29 percent, in 1962-1969, to 20.3 percent in 1970-1977, and to as low as 12.7 percent during the 1978-1981 period. While the average ratio of exports to imports declined from 108 percent in 1962-1969, to 69 percent in 1969-1977, and to 45 percent in the 1978-1981 period (see table III-8).

In contrast to balances on the trade account, balances on services moved increasingly into surplus(see figure III-2). The improvement in balances on services was, among other factors, mainly due to the reduction in the outflow of capital, especially investment income outflows. It has been argued that the nationalisation of foreign banks and insurance companies in 1967 and the tightening of foreign exchange control measures during the second half of 1960s contributed to a large extent to this improvement in the services account(Yaffey, 1970). The net outflow of investment income, which was one of the major components of the services account and averaged about $11.3 million per annum over the 1961-1966 period, was reduced to $2.2 million per annum over the 1968-1975 period (Balance Of Payments Statistics, IMF).This estimate of profit outflow does not, however, take into account investment income remitted by the private sector, transfer pricing, under invoicing of exports, remittance of payments to overseas head offices for management fees, royalties, agency fees, and profits on the importation of machinery. Including these hidden items to the official outflow of investment income, Yaffee(1970) estimated that profit outflow accounted for about 3 percent of GDP or 15-20 percent of the gross fixed capital formation over the 1961-1966 (p.187).

Net transfers were among the most stable components of the balance of payments over the period under study. Prior to the outbreak of drought in 1974-1975 and subsequent balance of payments difficulties faced by Tanzania in the second half of the 1970s, balances on transfers were generally positive and quite insignificant in size (see table III-9). The net transfers averaged only about Shs.40 million per annum over the 1961-1973 period. With the outbreak of drought in 1974-1975, and growing balance of payments difficulties in the second half of the 1970s, the government made several attempts to attract foreign aid to Tanzania. The gross aid disbursements at 1976-78 import prices rose rapidly from U.S.$69 million or 10 percent of import bill in 1966 to U.S.$224 million or 25 percent of the import bill in 1973 and to U.S.$377 million or 45 percent of import bill in 1980 (IBRD, 1980, table 3.4).

Despite favorable balances on services and transfer accounts, the current account experienced a growing deficit throughout 1970s and its size and direction was, as is evident from figure III-1, greatly influenced by movements in balances on the trade account.

Beginning with the mini balance of payments crisis of 1970-1971, the current account increasingly deteriorated in the 1970s. The size of the current account deficit, Shs.560 million in the down-turn of 1970-1971 balance of payments crisis, rose by more than three and half times in 1974-1975 crisis and more than eight-fold in 1980 (see table III-9).

Capital Account

The second striking feature of Tanzania's balance of payments has been a considerable increase in the country's reliance on medium and long-term loans to finance her growing deficits on the current account. As can be seen from table III-9, medium and long-term borrowing by government accounted for a major proportion of the total borrowing during the period under study. Parastatals were the second largest borrwers.

The government's borrowing, which averaged about Shs.110 million per annum in 1961-1969 rose to an annual average of Shs.900 million in 1970-1981. These loans were mainly of concessional types obtained from official sources. At the end of 1980, multilateral sources accounted for 47 percent, bilateral sources 46 percent, and private sources for only 7 percent of the distributed public debts(World Debt tables, 1981). As a result of this heavy reliance on foreign financing, Tanzania's outstanding indebtedness rose from U.S.$661 million at the end of 1971 to U.S.$2228 million at the end of 1980(World Debt tables, 1981). This level of foreign debt is quite small in comparison to the level of indebtedness of many other LDCs and Tanzania's ratio of debt service to her export earnings has remained below 10 percent of her visible export earnings (World Debt tables, 1981). However, what has been of real concern to policy makers, especially during the past few years, is the limited availability of official loans to Tanzania and the conditionality of these loans. During both the first mini balance of payments crisis of 1970-1971 and the second major crisis of 1974-1975, Tanzania was able to obtain a substantial amount of foreign aid to fill her growing trade gap without depressing the domestic economy and compromising her long-term development objectives.

The third striking feature of Tanzania's balance of payments over the 1962-1981 period has been the prevalence of more frequent swings in the trade and current accounts of 1970s as compared to the 1960s (see figure III-1). These fluctuations were mainly caused by internal and external shocks, such as fluctuations in the export prices, droughts, and faulty domestic policy.

In contrast to the 1960s when world prices for Tanzania's major export crops showed little change, these prices fluctuated considerably in the 1970s. (see section F.2). During this period, imports also showed considerable fluctuation. In addition to the drought of 1974-1975, war, and the break-down of EAC, fiscal and monetary policies implemented during this period were generally not tailored to smooth out fluctuations in exports and national income (see section F.3).

There are many reasons for poor performance of Tanzania's trade and current accounts. In what follows we briefly review the development of Tanzania's exports and imports over the period under study in relation to the commercial policies pursued by the government during this period. This enables us to single out the main factors underlying the poor performance of Tanzania's trade balance.

E.2. Exports

For a small open developing economy such as Tanzania's, exports generally play a major role in the determination of the country's import capacity, rate of economic growth, and the level of savings (Emery,1968; Voivodas,1973; Michaely, 1977; and Bhagwati,1978, chapter 6). In a recent study Stein(1978) found that within Tanzania, the association between exports and growth is not only positive, but either equal to or stronger than the average of those generally disclosed elsewhere (Stein, 1978, pp.236-237). This is not surprising for a developing economy which is at an early stage of industrial development. First, Tanzania inherited a small industrial sector at the time of independence and the country had to import a major proportion of industrial raw materials and capital for which there were few domestic substitutes. Secondly, in view of the insignificance of private foreign capital inflow into Tanzania and country's emphasis on self-reliance, its import capacity has been influenced greatly by the capacity of the economy to produce exports.

Growth and Commodity Composition of Exports

As evident from table III-8, Tanzania's exports performed poorly in the period under study . Exports lagged considieriably behind the growth rate experienced by the economy as a whole. As a result, the annual average share of export in GDP declined drastically from 26.4 percent in 1962-1969, to 20.3 percent in 1970-77, and to as low as 12.7 percent in 1978-1980. The value of exports at current market prices grew at an average rate of only 8.2 percent per annum over the 1962-1981 period. Growth rates of exports fluctuated considerably over the period under study from an average annual rate of about 6 percent in 1962-69 to 13 percent in 1970-77, and to as low as 2.5 percent in the 1978-81 period. It should be noted that the rapid rate of growth of exports in the 1970-77 period was basically due to the coffee boom of 1976-77. Excluding the latter period, the growth of exports would be reduced to an average annual rate of 8 percent (See table III-8).

Most of Tanzania's exports are of primary products. table III-10 sets out the commodity composition of Tanzania's exports over the 1962-1981 period. Primary products have been dominant throughout the period under study, accounting for about four-fifth of total exports. The remaining manufactured exports earned about 20 percent of total export receipts. As can be seen from table III-10, among primary products seven major crops, sisal, cotton, coffee, cashew nuts, clove, tea, and tobacco have contributed more than 70 percent of total exports of primary products. Both the volume and prices of these export crops have been subject to considerable fluctuations over the

TableIII-10. Exports by Industrial Origin.
(percent)

Products	Annual Averages			
	1964-66	1969-71	1974-76	1979-81
Primary(1):	86.5	77.7	79.6	81.2
Major items:	62.5	55.6	66.4	67.2
Sisal	20.3	8.4	10.3	6.1
Coffee	14.8	14.1	22.0	28.6
Cotton	16.8	12.9	14.2	11.7
Cashewnuts	5.3	7.5	6.9	5.2
Cloves	3.5	7.8	6.9	8.0
Tea	2.2	2.5	2.9	4.0
Tobacco	0.1	2.4	3.3	3.9
Minor items	24.0	22.0	13.2	13.7
Manufacturing(2)	13.4	22.1	19.3	18.3

Notes:
(1). SITC categories 0 to 3.
(2). SITC categories 3 to 9.

Sources: Compiled from Marketing Development Bureau, Year Book of International Trade Statistics, variou issues.

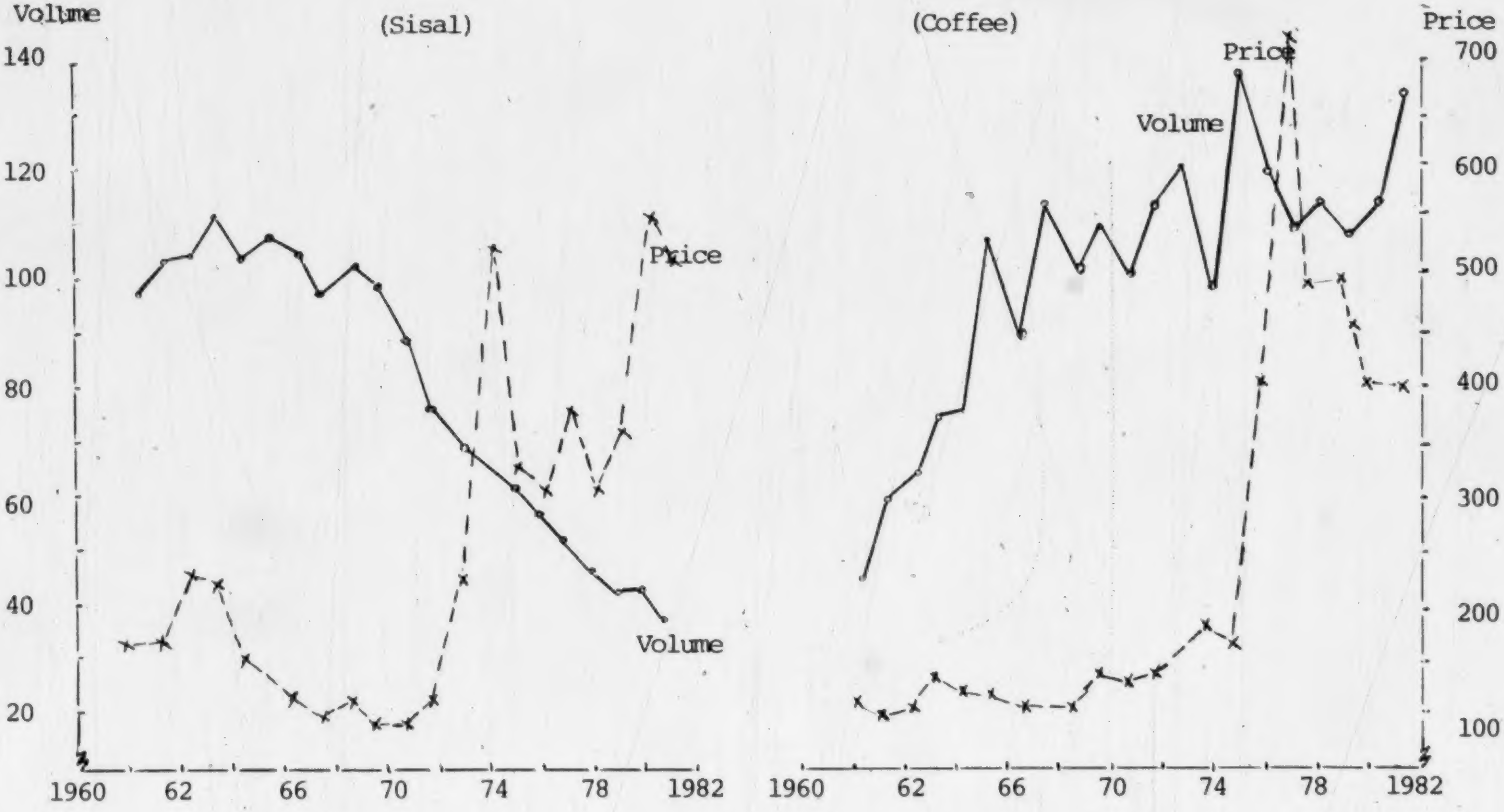
1961-1981 period. Figures III-2 though III-4 trace fluctuations in prices and quantities over this period.

The first striking feature of primary exports has been a general stagnation since 1965, in the production of the first three major export crops, sisal, cotton, and coffee. The decline in production has been more marked for sisal and cashew nuts than any other crops.

Sisal was Tanzania's foremost export crop up to 1965, accounting for about 29 percent of Tanzania's exports over the 1961-1965 period (See table A.1). The price of sisal declined drasticaly over the years of 1965-1971 in the world market. The world price of sisal which averaged Shs.1758 per ton during 1961-1964 dropped to Shs.1360 per ton in 1965 and to Shs.820 in 1971 (see table A.1). Though the price of sisal shot up with the four-fold increase in energy prices in 1973-1974 and stayed quite high in the second half of the 1970s, the marketed output of sisal continued declining throughout the 1970s (See figure III-2).

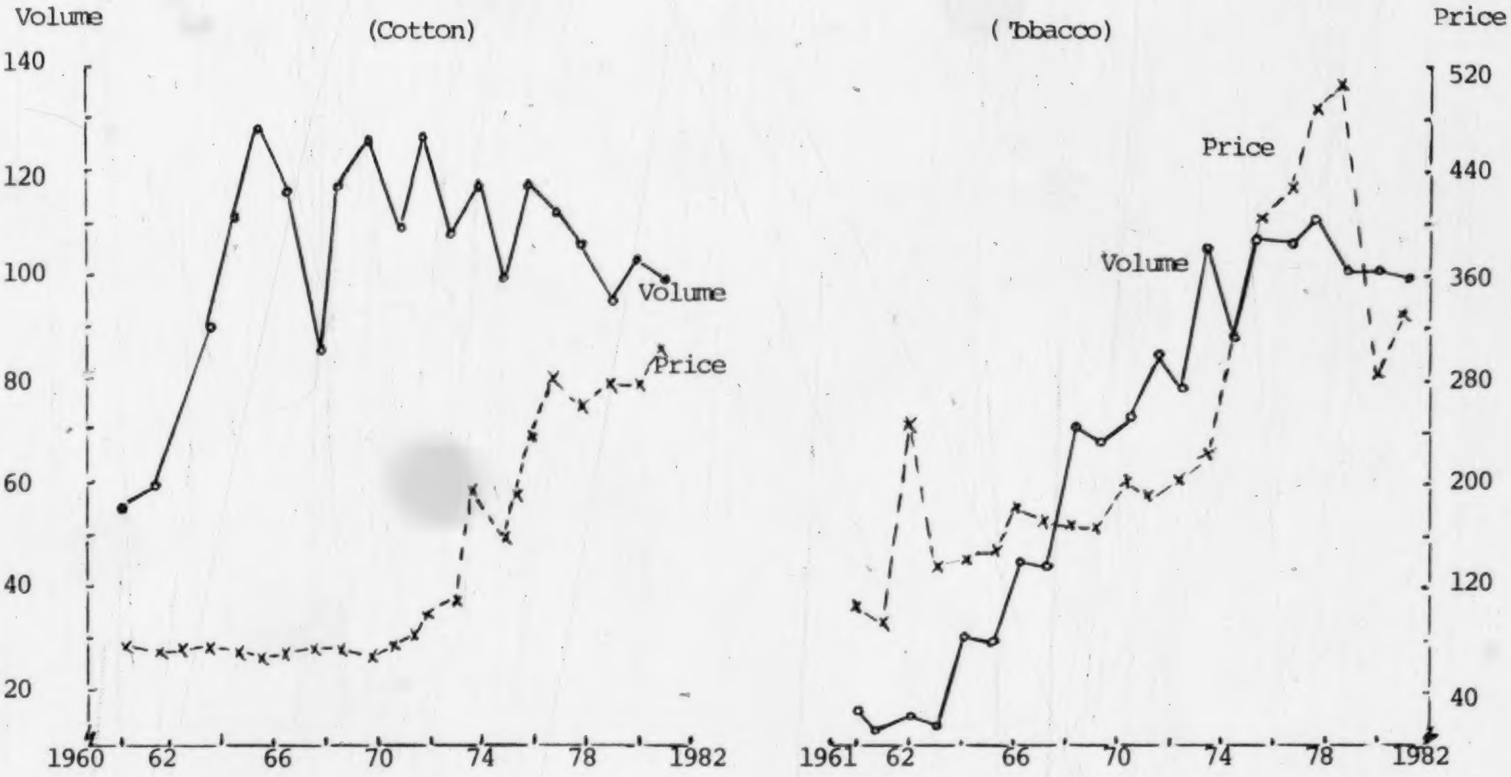
As table III-9 indicates, cashew nuts, a major export crop and one of the fastest growing export crop in the 1960s, also experienced a rapid decline in marketed output in the 1970s. In contrast to sisal, however, the main reasons for this decline in the production of cashewnuts are related to faulty domestic policies rather than the state of the world market(IBRD, 1977 and Green and et al., 1980). In fact, cashew nuts' prices which had remained stagnant in the 1960s rose drastically throughout the 1970s(see figureIII-4)

FigureIII-2. Sisal and Coffee, Marketed Output and Prices
(1967 - 1969 = average = 100)



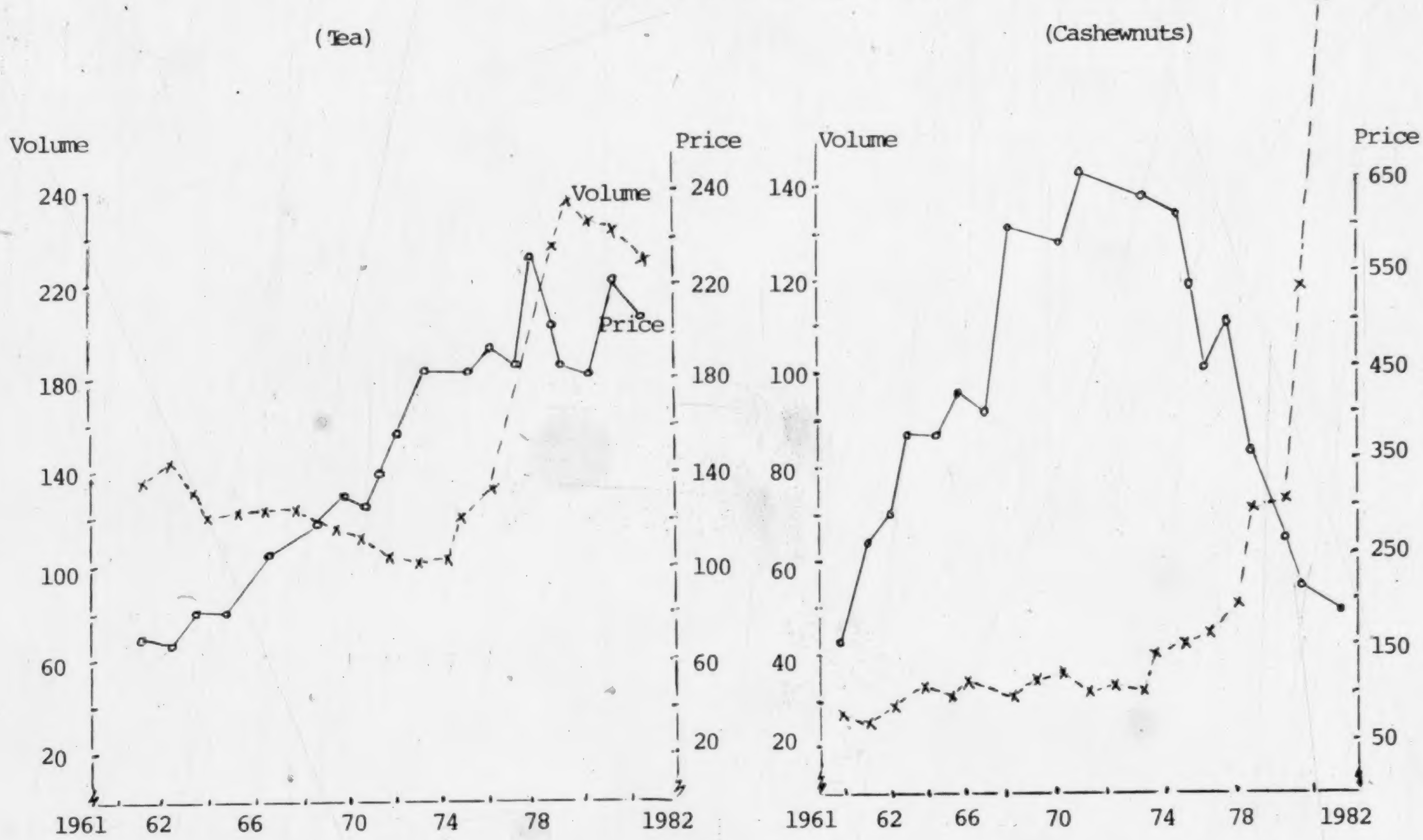
Source: see table A-1.

FigureIII-3. Cotton and Tobacco, Marketed Output and Prices
(1967 - 1969 = average = 100)



Source: see table A-1.

FigureIII-4. Tea and Cashewnuts, Marketed Output and Prices
(1967 - 1969 = average = 100)



Source: see table A-1.

Reasons for the poor performance of Tanzania' exports are many and complex. Authors of a recent study by the United Nations Development Programme, relate this poor performance to the following factors.

(i)*Poor performance of Tanzania's agriculture.* As was noted earlier, except for tea and tobacco, Tanzania's major export crops have fared poorly in quantity growth since 1965. The decline in volume of export crops mainly reflects the decline in domestic marketed output rather than the increase in domstic production of export crops (See tables III-3 and III-4). Domestic consumption of major export crops has been quite marginal, and except for tobacco, it does not appear that rising domestic consumption has cut into export surpluses (IBRD, 1980; and Weaver and Anderson, 1981).

(ii) *Absence of a coherent export strategy.* The second important reason for the poor performance of Tanzania's exports has been related to the absence, at the decision-making level, of a coherent export strategy or view of the role of exports. Because of planners' general pessimistic views of primary export-led growth, any general discussion of exports tended "to be querie as inconsistent with the national goal of self-reliance (Green and et al., 1980, pp. 87-88). It was only during the first balance of payments crisis of 1971-72 that it became clear to planners that economic growth would require greater absolute import levels. However, in view of continuous balance of payments difficulties developed througout the 1970s, commercial policies were mainly tailored to short-term problems, with little attention to export-development strategy. As a result, commercial polices were mainly aimed at controlling and regulating imports rather than expanding productive capacity to produce exports. Only during the past two years has the government recognized the need for an export-development strategy, and several measures have been taken to promote exports, especially exports of manufactured products.

(iii) *Export diversification.* Though Tanzania's primary exports are more diversified than many other LDCs, there has been little change in the commodity composition of primary exports, especially during the past decade. The three traditional export crops, sisal, cotton, and coffee, have continued to dominate Tanzania's primary exports, accounting for more than two-thirds of total primary exports (see table III-9); and

iv) *Research at farm management level.* Research on export crops or on their integration into farm production and domestic industrial crops has been generally inadequate, sporadic, and often confined to a few export crops.

E.3. Imports

For a small developing economy such as Tanzania, imports typically play a crucial role in the process of economic development. Imports include not only final consumption goods, but also intermediate and capital goods which in most cases can not be produced domestically. The latter are mainly used as inputs in the production of domestic output. The shortages of these essential imported inputs often lead to interruptions in production. As such, imports are not only determined by changes in the level of income as suggested by the standard demand for import equation, but they also act as one of the important prequisites for such an increase in income.

During the past three successive development plans, (1964-1981) policy makers have continuously pursued various commercial policies in order to control the volume and the composition of imports into Tanzania. These policies have been quite diversified, ranging from direct import control through import licensing and foreign exchange control, to tariffs and tax tranfers. Generally, objectives underlying such policies have been; (i)protection of import-substituting industries; (ii) reduction in importation of luxury consumer items; (iii) allocation of scarce foreign exchange according to the national development objectives; and (iv)maintance of trade balance.

Whatever the merits of such import control policies might be, Tanzania has been able to control effectively and influence the volume and the composition of imports(Green, and et al., 1980; and Weaver and Anderson, 1981). As table III-7 shows, the value of imports grew at an average annual rate of 12.6 percent, raising the import bill from Shs.1198 million in 1962 to Shs.10308 million in 1980. The behavior of imports can be examined in terms of differences in the rate and the character of the growth of imports under two distintive sub-periods, 1962-1969, and 1970-1981.

During the 1962-1969 period, the value of imports at current market prices grew quite moderately, at an average annual rate of 6.5 percent, to an approximately 16 percent rate of the growth of imports during the 1970s period (see table III-7). More importantly, this growth rate of imports was achieved when imports were subject to fewer quantitative restrictions. During this period, both monetary and fiscal policies were quite restrictive, and the world rate of inflation was running at a slower rate than in the 1970s. The value of imports at constant 1966 prices grew at an average annual rate of only 4.8 percent during the 1962-1969 period(World tables, 1976).

Imports grew quite rapidly during the 1970s, despite widespread shortages of foreign exchange, and the tightening of the foreign trade restrictions during this period. Over the 1970-1981 period, imports grew at an average annual rate of more than 16 percent (see table III-7). The growth of imports during this period, has been among other factors, contributed by; (i)the generally expansionary fiscal and monetary policies; (ii)higher world inflaton in general and the four-fold increase in prices of oil and food grains in particular; and (iii)the construction of the Tanzania-Zambia Railway (TAZARA), the drought of 1974-1975, and war with

Uganda(Green and et al., 1980; Weaver and Andeson, 1981).[6] [7]

In real terms, imports grew at a much slower rate during this period. Imports at 1966 prices grew at an average annual rate of only 3.7 percent during 1970-1977 period, and declined in absolute terms over the years 1978-1981(World table, 1980). The slower growth of imports during the later period was mainly due to the severe shortages of foreign exchange, and the tightening of exchange control measures during this period(IBRD, 1980).

Origin of Imports

Table III-11 shows, the origin of imports into Tanzania over the period under study.

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[6] TAZARA connects land locked Zambia to the Indian ocean through Tanzania. The $450 million project was entirely financed by the Chinese government through a 30-year interest free loan. China also extended import credits to Tanzania and Zambia according to which Tanzania and Zambia were allowed to import consummer goods from China, and the local currency gained by their sale was to pay the local cost of the project. The TAZARA's imports are estimated to amount to an annual average of 14 percent of total imports during the 1970-1975 period(Clark, 1978).

[7] Imports of the mineral fuels which accounted for only 6.4 and 8.5 percent of the import bill in 1966 and 1970 respectively more than doubled by 1976(*Annual Trade Reports*). Imports of mineral fuel which accounted only for 6.4 percent and 8.5 percent of the total import bill in 1966 and 1970 respectively more than doubled by 1976 (*Annual Trade Report*.) The severe drought of 1974-1975 and the high world prices of food grains during this period also contributed greatly to the rise of import bill. The import of food grains increased from Shs.276 million in 1973 to Shs.1066 million in 1975 (see Green and et al., 1980, p.25). Excluding the 1974-1975 period, imports grew at an average annual rate of 14.7 percent during the 1970-1977 period, and at about 13 percent during the 1988-1981 period (see table III-7).

TableIII-11. Origin of Imports, 1961 - 1980
(percentage shares)

Country of Origin	1961	1966	1971	1976	1980
Sterling Area:	63.4	55.7	40.0	32.7	25.0
United Kingdom	29.4	23.7	16.6	12.1	17.8
India	5.4	3.4	2.4	4.2	2.9
Hong Kong	-	1.9	1.2	1.2	0.5
EAC	21.1	20.3	13.7	8.5	0.8
Others	7.0	5.9	6.7	3.0	-
EEC	12.3	17.2	20.5	22.9	29.0
North America	4.2	5.1	7.6	6.7	7.1
Japan	8.9	5.5	6.3	8.1	8.8
CMEA	-	1.9	1.6	0.9	3.6
China	-	4.4	11.6	6.6	1.0
Others	11.7	15.7	18.5	22.1	25.5
Total	100.0	100.0	100.0	100.0	100.0

Sources: Annual Economic Survey, and Year Book of International Trade Statistics, various issues.

At the time of independence, Tanzania's imports predominantly originated in the sterling area. In 1961, the United Kingdom alone accounted for about 30 percent of total imports into Tanzania.

After independence, the government made several attempts at diversifying import sources. Trade relations with the European Common Market(ECC) was strenghtened and new trade relations were developed with East European countries and mainland China. As a result, imports from the sterling area dropped from about 63 percent in total imports in 1961 to 29 percent in 1980, and imports from EEC rose from about 12 percent of total imports in 1961 to 29 percent in 1980(see table III-11). Imports from the East African Community almost ceased following the border closure between Tanzania and Kenya.

E.4. Commercial Policies

Import substitution has been a major objective of Tanzania planners during the period under study. Throughout the 1960s, the government resorted to imposition of tariffs and transfer taxes on the imports from the EAC and the rest of the world in order to improve the country's growing trade gap. During this period, the government also periodically resorted to foreign exchange control measures to check the flight of capital, especially to Kenya.

Except for a moderate tariff stucture and occasional foreign exchange controls on capital out-flows, the economy enjoyed a fair degree of openness until the beginning of the 1970s. Due to the frequent emergence of balance of payments difficulties in 1970s, foreign transactions were increasingly subject to very complex regulatory policies. Common to all these policies was the government's preference for quantitatively restrictve measures, (such as import-licensing and foreign exchange controls), rather than the use of exchange rate adjustment policies.

During the period under study, little use was made of the exchange rate instrument. The Tanzanian Shilling was pegged to pound sterling till 1967, switched to the US dollar, and then to SDR in 1975. Since 1979 the Tanzanian Shilling has been pegged to a basket of currencies consisting of the Tanzania's major trading partners.

Exchange rate adjustment policy has generally been regarded by Tanzanian policy makers as inferior to direct exchange controls, import licensing, and import and export taxes and subsidies. As a result the government has avoided any major devalution unless, "the costs of manipulation without altering the exchange rate (were) seen as unacceptably high,"(Green, et al., 1980, p.50).

The government's view of exchange rate policy is based on the standard critiques of the devaluation in LDCs. It is argued that, in the short run, for a small developing economy as in Tanzania, the balance of payments deficit is "structural"; neither imports nor exports are very sensitive to the change in prices. The demand for imports is argued to be price inelastic since imports consist mainly of intermediate and capital goods for which there are no domestic substitutes. As a result, devaluation would not reduce imports but would lead to the same volume of imports at higher prices and a higher domestic rate of inflation.

In the case of exports, the argument is that for a small country the price of exports in terms of foreign currency is set by the world market, and since exports consist mainly of primary products the supply tends to be price inelastic (at least in the short-run).

Because of the government's pessimism concerning efficacy of foreign exchange rate adjustment in resolving balance of payments deficits, the government has increasingly moved to a very complex system of quantitative restrictions for checking flows of imports and maintaining a disequilibrium exchange rate. These restrictions, as with many other government policies, have been evolved as government's response to the prevailing balance of payments difficulties and have shown a considerable fluctuation in degree of restrictionism, depending on the performance of exports and the net inflows of foreign aid.

Major import restriction policies were introduced in 1971-1972 as a responce to the mini balance of payments crisis experienced by the economy in 1970-1971. These policy measures have continued till the present. Among policy measures undertaken in 1971-1972 were; (i)a formal foreign exchange budgeting involving import licensing and exchange controls; (ii)establishment of a systematic price-monitoring capacity for some key importable and exportable items; (iii)the reorganization of existing public importing agencies, and more public controls over imports; and (iv)introduction of a system of credit-budgeting, encompassing all commercial banks and Central Bank's lendings.

While for the purpose of crisis management, quantitative restrictions are generally effective in terms of their immediate impact on imports, the efficacy of these instruments must also be a major concern. Though there have been no attempts to study the impact of exchange control policies on the Tanzanian economy, the available evidence for other LDCs tends to suggest that the static and dynamic efficiency effects of exchange control measures are generally adverse.[8]

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[8] For a comprehensive theoretical and empirical review of literature see Bhagwati(1978). Some of the main consequences of exchange controls are listed as follows;
(i) a disregard of opportunity costs in allocation decisions, and a decline in investment and its productivity as measured by the marginal output-capital ratio;
(ii) under-utilization of capacity, resulting from high incentive created by exchange controls and from bottlenecks created by bureaucratic procedures for obtaining import licenses;
(iii) excess holdings of inventory, resulting from uncertainties surrounding allocation of foreign exchanges;
iv) a relative cheapening of imported inputs and capital goods and subsequently tendency for utilization of more capital intensive technique than suggested by the country's available factor endowment;
(iv) an import bias which inhibits the employment of the excess capacity for the export market;
(vi) slow growth of domestic savings which results from import requirements increasing effects of exchange control measures and from more foreign exchange binding constraint rather than saving constraints; and

F. Financial System and Monetary Policy

The main institutions through which monetary policy is implemented are the central bank, a number of publicly owned and specialized banks providing long term finance for agricultural and industrial projects, foreign commerce, transportation and housing, and marketing of agricultural products. In what follows, we briefly examine the process of money creation by the central bank and the commercial banking system.

F.1. The Bank of Tanzania

Before the establishment of the Bank Of Tanzania in June 1966, Tanzania was part of the East African Currency Board (EACB). The EACB, established in 1919 in London, was a fully automatic currency board system which played the role of an automatic money exchanger, issuing and redeeming the East African Shilling in exchange for Sterling.

The Board had no control over the money supply in the region for that quantity was mainly determined by the state of the balance of payments of the member country. Board regulations were quite restrictive in regard to the provision of loans and investment in government and other domestic securities. Governments of the member countries were not allowed, according to Board regulations, float in which their own reseves could be invested. Instead, reserves

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'(cont'd) (vii) an encouragement of illegal transactions such as smuggling and faked invoicing, black markets, and abuses in the distribution of import licenses.

were invested only in the British Sterling securities or in the sterling assets of British Dominions.

It was only during the last ten years of the existence of the Board that regulations of the EACB were revised allowing the Board to carry out certain functions of a central bank. According to these new regulations, the Board was allowed to invest a total of not more than 10 million pounds sterling in the securities of the member country or in other securities guaranteed by the government of the member country. The revised regulations also granted the EACB a limited right to fiduciary issue. The limit was set at 10 million pounds sterling in 1955, which was later raised to 20 million pounds sterling in 1957 and finally to 35 millon pounds sterling 1964(IMF, 1967). The EACB was also allowed to set up a fund for financing the marketing of export crops. However, despite these and other attempts made to transform the EACB into a regional central bank, no general agreement was reached among the member countries and the Board finally ceased to operate in 1966.

The Bank Of Tanzania, as the central bank of the country was established by an act of parliament in December 1965 and began its operation in June 1966. Like any other central bank, its broad objective is briefly stated to be, "the promotion of credit and exchange conditions conducive to the rapid growth of the national economy of Tanzania, due regard being had to the desiability of fostering monetary stability". The Bank is assigned all normal functions of a central bank such as the issue of currency, banker of the Government and commercial banks, the regulation of banking and credit, maintance of external reserves and other functions conferred upon it under any international arrangements to which Tanzania is a party. The Bank is exclusively state-owned with a capital of Shs.20 million. On June, 14, 1966 the Bank began issuing its own currency, the Tanzanian Shilling which gradually replaced the East African currency.

The Bank, like central banks in other developing countries, has played a crucial role in its capacity as government banker and fiscal agent and financial advisor to the Government. The Bank is authorized to make direct advances to the Government and to issue and redeem securities on behalf of the Government. These advances are not to exceed 20 percent of the average annual ordinary revenues of the Government during the three previous fiscal years, nor a longer duration than 300 days. Interest rates charged by the Bank on these advances remained almost constant over the 1966-1981 period, ranging between 4.27 and 6.5 percent depending on the type and duration of advances(*Bank of Tanzania, Economic Bulletin, 1982*). These rates were slightly revised upward in 1978.

The Bank is also empowered to deal in the government and government-guaranteed securities, but the holding of government securities may not exceed 25 percent of the Government's average ordinary revenues over the three previous fiscal year. In view of the narrowness of the domestic capital market, the Bank is obliged to accommodate government financial requirements and to absorb the bulk of the purchases or sales of government securities made by other transactors in order to maintain the security prices as stable as possible. Thus, in contrast to developed countries where central banks' dealings are usually associated with open market operations, the purchase of securities by the central bank of a developing country are intended explicitly for the provision of liquidity for development or for public deficit financing. Under such circumstances, monetary policy techniques associated with the function of the Bank as a last resort lending source is likely to be of limited use.

The Bank also exercises wide power over the commercial banks. As a means of controlling and regulating credit, it prescribes, (i)the minimum and maximum rate offered and charged by the commercial banks on their deposits and loans; (ii)the volume and direction of the commercial banks'lendings; (iii)the minimum cash reserve ratio to be maintained by banks; and (iv)mandatory bond holdings. The last two monetary instuments, as we shall see soon, transfer the Bank into a financial intermediary through which financial resources are transferred from the private sector to the public sector.

The Bank acts as a banker to commercial banks by accepting deposits and collecting monetary claims on behalf of the banks. The Bank is authorized to purchase, sell and rediscount treasury bills, bills of exchange, and promissory notes issued for the purpose of financing the marketing of agricultural products and foreign commerce. The commercial banks may obtain loans and advances from the central bank against bills of exchange and promissory notes for a period not exceeding six months.

Finally, one of the essential central banking functions performed by the Bank is the maintenance of the external value of Tanzanian Shilling. To achieve this objective, the Bank holds and manages most of the country's foreign exchange reserves through direct control of all foreign transactions. These reserves consist of gold, deposits with foreign central banks or the Bank' agents abroad, securities issued or guaranteed by governments or international financial institutions and any liquid and convertable foreign exchange assets or international drawing rights, which the Minister of Finance, after due consultation with the International Monetary Fund, considers acceptable for inclusion. The Bank is also required to maintain foreign reserves at a level of not less than the value of four months imports based on the average of the three preceeding years.

Monetary Instruments

However, despite the wide diversity in potential monetary instruments available to the Bank, in practice the

Bank makes a limited use of them. Several reasons have been advanced in the literature of monetary policy in LDCs to explain the limited aplicability of monetary instruments in these countries (Park,1973; Ghatak,1981; And Onoh,1982).

Firstly, the most serious institutional factor which limits the role of, and scope for monetary policy is the narrow size of the money and capital markets and the presence of a limited array of financial stocks. The security market in Tanzania has been primarily dominated by the government securities which are almost entirely held by the central bank, commercial banks,and non-bank financial institutions. The effectiveness of open market operations is further hindered by the commercial banks' holding of cash-deposit ratio which frequently exceed the legal ratio(Ghatak, 1981, pp.108-109).

Secondly, in most LDCs, including Tanzania, a major proportion of the money supply is held in form of currency by the public. This, as Park(1973) notes, reduces the capacity of the banking system to create additional credit on the basis of an increase in its reserves.

Thirdly, because of the dualistic nature of financial markets in LDCs, monetary authorities' influence is generally limited to the modern sector.

In such a financial environment, most of the traditional monetary instruments such as open market operations, discount rates and interest rate policies are subject to many technical limitations. Only the variation of reserve requirements of the commercial banks, the direct control of central bank credit to commercial banks, aggregate credit ceilings, and selective credit control are generally regarded as potentially powerful and effective instruments of monetary policy available to the central bank.

To interprete the Central Bank's role in the creation of domestic credit in Tanzania and the extent of control exercised by the Bank over its monetary environment, the following section briefly summarizes the development of assets and liabilities held by the Bank over the 1966-1981 period.

F.2. Domestic Credit, Assets and Liabilities of the Bank of Tanzania

Table III-12 summarizes structural changes in the distribution of major assets and liabilities of the Bank over the period 1966-1981.

Since its inception, the Bank has experienced a remarkable growth. The total assets of the Bank which stood at about Shs.638 million by the end of 1966 more than doubled by the end of 1972. The growth rate of the Bank's assets was even more remarkable over the 1973-1981 period. Total assets grew from Shs.1496 million at the end of 1973 to Shs.9594 million by the end of 1981, an increase of 638 percent over an eight year period.

Table III-12. Main Assets and Liabilities of the Bank of Tanzania, 1966-1981.
(percent)

End of Year	Total assets (Shs. million)	Foreign assets	Claims against		Currency in circulation	Foreign liabilities
			Government	Banks		
1966	638	63.6	13.2	13.8	67.7	2.7
1967	586	69.1	10.9	9.2	92.0	1.3
1968	763	68.0	4.2	10.7	74.4	0.9
1969	774	69.8	19.1	4.3	84.0	1.2
1970	934	44.0	44.5	7.6	69.8	21.1
1971	1203	31.2	53.0	13.5	71.6	18.4
1972	1497	51.9	37.1	9.1	70.2	17.4
1973	1496	63.9	33.9	-	68.8	16.0
1974	2384	16.4	44.3	37.8	58.6	30.9
1975	2961	18.4	46.2	34.0	56.1	33.8
1976	3363	27.8	47.6	21.8	58.8	32.7
1977	4091	56.1	32.0	9.3	57.0	35.2
1978	4678	16.2	61.4	11.0	60.3	31.1
1979	6412	11.3	78.6	3.6	61.2	27.9
1980	8298	5.4	78.9	3.5	60.7	25.7
1981	9594	3.5	83.2	4.9	66.4	19.0
Annual averages:						
1966-1969		67.6	11.8	9.5	79.6	1.5
1970-1974		67.6	42.6	13.6	67.8	15.4
1977-1981		18.5	66.8	10.8	61.2	27.8

Sources: Bank of Tanzania, *Economic Opertion and Reports*, June 1981 and *Economic bulletin*, December 1981.

The most striking feature of structural changes in the asset composition of the Bank's sheet has been an astonishing growth in the Bank's holding of government securities and treasury bills over the Second and Third FYDPs (1969-1974, 1969-1981). The Bank's claim on the government which accounted for an average annual rate of 12 percent of the Bank's assets over the last four years of the First FYDP (1966-1969) rose to over 42 and 66 percent in the Second and the Third FYDPs respectively (see table III-12). During this period, fiscal authorities relied heavily on the central bank as a financial intermediary and as a lender of last resort to finance their financial requirements.

The other striking feature of structural change in the Bank's assets has been the rapid depletion in the Bank's holdings of foreign assets. As table II-12 indicates, foreign assets which constituted more than two-thirds of the Bank's assets over the 1966-1969 period dropped to about two-fifth during the Second FYDP (1969-1974), and to as low as 18.5 percent during the Third FYDP (1976-1981).

The extraordinary expansion of assets was matched by a marked increase in two types of liabilities - currency in circulation and foreign liabilities - that together accounted for about 87 percent of the total liabilities. Currency in circulation has alone accounted for more than two-thirds of the total liabilities over the period under study (see table III-12).

F.3. Domestic Credit Creation

We have defined the money supply(M1) as equivalent to the product of the money multiplier(m) and the monetary base(H);

$$M = m \cdot H \qquad \text{(II-1)}$$

Annual changes in the money supply can be viewed as the product of changes brought about by changes in (i)the money multiplier, (ii)the monetary base, and (iii)a combination of (i) an (ii). More formally it can be shown that;'

$$\Delta M = \Delta H \cdot m_{-1} + \Delta m \cdot H_{-1} + \Delta m \cdot \Delta H \qquad \text{(III-2)}$$

where $\Delta H \cdot m_{-1}$ is the increase in money stock due to expansion of the monetary base and $\Delta m \cdot H_{-1}$ increase in money stock due to changes in the money multiplier. If the cross product term, $\Delta m \cdot \Delta H$ is small it can be distributed evenly between the other two terms or be ignored.

Table III-13 summarizes the contribution of each factor to the annual changes in money supply over the period under study. As evident from table III-13, changes in the net claims against the government were the major forces behind

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' Define

$$\Delta H = H - H_{-1} \qquad \text{III-2(a)}$$

Lag both sides of III-1 by one period,

$$M_{-1} = m_{-1} \cdot H_{-1} \qquad \text{III-2(b)}$$

Substract III-2(a) from III-2(b),

$$\Delta M = M - m_{-1} \cdot H_{-1} \qquad \text{III-2(c)}$$

Define

$$m = \Delta m + m_{-1} \qquad \text{III-2(d)}$$

$$H = \Delta H + H_{-1} \qquad \text{III-2(e)}$$

Substitute III-2(d) and III-2(e) into III-1,

$$M = (\Delta m + m_{-1})(\Delta H + H_{-1})$$

or

$$M = \Delta m \cdot \Delta H + \Delta m \cdot H_{-1} + \Delta H \cdot m_{-1} + m_{-1} \cdot H_{-1} \qquad \text{III-2(f)}$$

Substituting III-2(c) into III-2(f) yeilds III-2.

TABLE III-13. Money Multiplier and Components of Increase in Money Stock

Quarterly averages:	Money Multiplier (m)(2)	Changes in Reserve base (ΔH)	Changes in Money Multiplier (Δm)	Changes in Money Stock (ΔM1)	Increase in Money Stock due to H(3)	Increase in Money Stock due to m(4)	Increase in Money Stock due to H&m(5)
1967	2.09	-66	0.21	-17	-124	119	-14
1968	2.29	46	0.20	202	96	100	9
1969	2.59	56	0.30	312	128	164	17
1970	2.21	166	-0.38	141	430	-229	-63
1971	2.05	154	-0.16	191	340	-123	-25
1972	1.92	181	-0.13	229	371	-120	-24
1973	2.04	125	0.12	389	240	132	15
1974	2.23	192	0.19	663	392	234	36
1975	2.37	255	0.14	796	569	199	36
1976	2.46	339	-0.09	993	803	151	31
1977	2.48	310	0.02	807	763	40	6
1978	2.33	424	-0.15	633	988	-349	-64
1979	2.39	1063	0.06	2695	2477	165	64
1980	2.41	1108	0.02	2761	2648	76	21
1981	2.33	1223	-0.08	2466	2947	-394	-98

Notes:
(1) In view of considerable seasonal variations in the money stock and its components quarterly averages are calculated using the sources listed below.
(2) $m = M/H$
(3) $m_{-1} \cdot H$
(4) $H_{-1} \cdot \Delta m$
(5) $\Delta H \cdot \Delta m$

Sources: Bank of Tanzania, Economic Bulletins; and IFS, various issues.

the expansion in the money supply over the 1962-1981 period. Changes in the money multiplier were of least importance, especially during the second half of 1970s when the behavior of the money multiplier showed little variation.

F.4. Behavior of the Monetary Base

Following the source definition, the monetary base is composed of net foreign assets held by the monetary authorities(FA), net claims on the government(CG), net claims on the commercial banks(CB), and other net items(OI). Changes in the monetary base then can be written as;

$$\Delta H = \Delta FA + \Delta CG + \Delta CB$$

As table III-14 shows, changes in the net foreign assets and claims on the government have been the dominant source of changes in the expansion of monetary base over the period under study. Five distinctive phases can be identified in terms of differences in the rate and character of the growth of monetary base, 1962-1965, 1966-1971, 1972-1973, 1974-1976, and 1977-1981.

Table III-14. Monetary Base and its Comoponents, 1962-1981.
(Shs.million)

			Claims against							
Quarterly averages	Foreign assets (net)	Δ	government (net)	Δ	commercial banks (net)	Δ	Other items (net)	Δ	Total	Δ
1962	362	5	79	2	-	-	48	-	489	-
1963	421	59	72	-7	-	-	-31	-79	462	-27
1964	421	-6	71	-1	-	-	-43	-12	443	-19
1965	415	-43	101	30	-	-	51	94	524	81
1966	541	169	-82	-183	94	-	-12	-63	541	-17
1967	471	-70	-21	61	53	-41	4	16	507	-34
1968	599	128	-56	-35	39	-14	-40	-44	542	35
1969	565	-34	1	57	41	2	-14	-26	593	51
1970	500	-65	272	271	55	14	71	85	890	297
1971	480	-20	503	231	78	23	137	66	1198	308
1972	637	157	563	65	96	18	197	60	1498	300
1973	980	343	477	-91	-	96	230	33	1687	189
1974	417	-563	863	386	550	550	271	41	2101	414
1975	-186	-603	1213	350	893	343	243	-28	2163	62
1976	-108	78	1417	264	842	-51	196	-47	2407	244
1977	882	990	1478	1	213	-629	248	52	2821	414
1978	201	-681	1260	682	641	428	254	6	3256	435
1979	-930	-1131	4764	2604	146	-495	167	-87	4147	891
1980	-1079	-149	5860	1096	285	139	145	-22	5211	1064
1981	-1232	-153	7492	1632	290	5	408	263	6958	1747

Notes:
(1)Δ = change.

Sources: See table III-12.

Phase-1 (1962-1965)

Prior to the establishment of the Bank of Tanzania, foreign assets accounted for a considerable proportion of the monetary base (about 82 percent) and changes in the monetary base were entirely caused by the variations in the foreign assets. During this period, Tanzania formed part of the East African Cuurency Board. The money supply was exogenously determined, and the Government had limited accessibility to the financial resources of the banking system. As can be seen from table III-14, during this period, the monetary base grew quite slowly, at an average annual rate of about 3 recent, and foreign reseves accounted for about 10 percent of the total assets held by the Board.

Phase-2 (1966-1971)

The establishment of the Bank of Tanzania in 1966 and the reorganization of the commercial banks gave the monetary authority autonomy in the conduct of the monetary policies. The monetary policy of the Bank of Tanzania and of the government which controls it to a large extent, was directed primarily toward meeting the financial requirements of the government's annual fiscal plans. The result of these changing policies are evident in the growth and the character of the assets of the central bank.

In contrast to the slow growth of the monetary base during the first phase, the monetary base grew quite rapidly during this phase, raising the stock of the monetary base from Shs.524 million at the end of 1965 to Shs.1198 million by the end of 1971 (see table III-14).

As can be seen from table III-14, this rapid growth was accompanied by a drastic change in the asset composition of the monetary base. The net claims on the government rose steadily to as high as 42 percent of the monetary base by the end of 1971. During this period, the share of foreign reserves in the total assets held by the Bank declined considerably to as low as 40 percent (see table III-14).

Phase-3 (1972-1973)

Expansion in the domestic credit experienced by the economy during the previous phase was scaled down in this phase. The introduction of credit-budgeting and its incorporation into the annual fiscal plan in 1971/1972 put a limit on the size of credit extended by the central bank and commercial banks to the government and private sector. The treasury's financial requirements were greatly reduced during this period as the economy recovered from its first mini balance of payments crisis of 1970-1971.

As can be seen from table III-14, changes in foreign reserves were the main forces behind the expansion of the monetary base during this period. The foreign reserves holdings of the Bank of Tanzania grew from Shs.480 million at the end of 1971 to Shs.1687 million by the end of 1973, raising the share of the foreign reserves in the Bank's total assets from 40 percent to 58 percent.

Phase-4 (1974-1976)

During this period the monetary authority found it difficult to maintain the monetary discipline of the previous phase. Over the 1974-1976 period, the economy was faced with a number of internal and external shocks which led to severe fiscal and trade imbalances.

The severe drought of mid 1973-1975, a four-fold increase in the prices of food grains and oil and the general poor performance of agricuture brought the economy under substantial amount of pressures not experienced by country before. In view of government's attempts to maintain development momentum, both the treasury and commercial banks relied heavily on borrowing from the central bank in order to finance the fiscal imbalances of the public sector. This was mainly achieved by a substantial amount of foreign aid made available to Tanzania. As table III-14 shows, foreign assets held by the Central Bank dropped considerably during this period from Shs.980 million at the end of 1973, to Shs.-186 million at the end of 1974, and to Shs.-108 by the end 1976 respetively.

Phase-5 (1978-1981)

By late 1976, the economy had already started showing signs of recovery. The two years of good weather and coffee boom of 1976-1977 replenished the Bank's foreign reserves and reduced the treasury and commercial banks' reliance on the Central Bank. However, this recovery turned out to be illusory and short-lived. With the disappearance of the coffee boom and extraordinary good weather conditions, the domestic monetary base repeated its pattern of growth as it had revealed during the second and fourth phases.

During this period, the domestic monetary base experienced its most rapid rate of growth. The stock of the domestic monetary base which stood at Shs.2821 million at the end of 1977 grew by about 147 percent over four years period (1977-1981). Due to the rapid deterioration in the fiscal balances during this period, the treasury relied heavily on the borrowing from the central bank to finance fiscal deficits. As a result, net foreign assets declined steadily between 1978 and 1981 from nearly Shs.201 million to Shs.-1232 million by the end of 1981 (see table III-14). At the end of 1981, claims on the government amounted to Shs. 7492 million, or about 70 percent of the total assets held by the Bank of Tanzania.

F.5. Commercial Banks

Before the nationalization of commercial banks in 1967, the banking system was dominated and controlled by the branches of major foreign banks. Of the total eleven commercial banks operating in Tanzania on eve of nationalization, four were local and the rest were the branches of foreign banks. Under the Arusha Decleration of Febraury 1967, all foreign banks were nationalized and their assets and liabilities merged into the state owned National

Bank of Commerce(NBC). The NBC is responsible for most of the commercial banking business of mainland Tanzania. In addition to the NBC and the Bank of Zanzibar, there are three development banks which provide long-term finance for agriculture and industrial projects, three specialized banks (Tanzania Housing Bank, the National Provident Fund, and National Insurance Corporation) and one savings bank. The nationalization and reorganization of the banking system contributed to the growth of commercial banking system and the transformation of Tanzania's financial system.

Table III-15 summarizes the achievement of commercial banks in mobilizing financial resources and extending credit to the various sector of the economy over the 1967-1981 period.

As table III-15 shows, total assets held by the commercial banks grew from Shs.1298 million at the end of 1967 to Shs.8910 million by the end of 1981, at an average rate of 18 percent per annum. During this period, commercial banks were able to attract a massive amount of deposits. As evident from table III-15, the total deposits grew from Shs.1014 million at the end of 1967 to Shs.14868 million by the end of 1981, an average annual rate of 20.6 percent. Interest paid on various types of deposits by commercial banks has remained almost unchanged over the 1967-1981 period. More recently, the Bank of Tanzania has revised the interest rates offered by commercial banks upwards in order to stimulate the attraction of interest-bearing deposits.

Table III-15. Main Assets and Liabilities of Commercial Banks ., 1966-1981.
(percent)

End of period	Total assets (Shs.million)	As % of total assets			Total deposites (Shs.million)	As % of total libilities		
		Treasury bill& Govt. stocks	Loans and bills			Demand	Time	Saving
			official entities	private sector			deposites	
1966	1327	1.2	1.0	58.9	927	67.2	17.6	15.2
1967	1298	3.3	5.3	57.0	1033	66.4	19.9	13.7
1968	1558	9.2	9.3	47.9	1289	59.9	27.7	12.4
1969	1957	9.4	15.6	39.1	1596	58.9	30.0	11.1
1970	2220	6.8	30.7	28.6	1809	54.6	34.1	11.3
1971	2761	10.7	32.9	18.9	2203	54.8	35.4	9.8
1972	3063	15.0	27.8	20.5	2489	51.4	37.8	10.8
1973	3556	17.2	35.0	13.9	3020	55.6	33.4	11.0
1974	5198	17.3	42.5	11.8	3521	64.3	24.2	11.5
1975	6489	23.3	40.5	9.9	4531	63.8	25.6	10.6
1976	7701	28.0	40.0	7.1	5567	63.7	24.5	11.8
1977	8403	22.2	43.4	8.0	6500	67.9	21.2	10.9
1978	10132	19.1	49.4	9.6	7504	62.9	25.8	11.3
1979	12923	25.2	43.3	8.0	10523	66.7	23.2	10.1
1980	16362	29.4	37.5	6.9	12911	67.1	22.8	10.1
1981	18910	33.0	38.0	6.4	14986	63.2	26.7	10.6

Sources: See table III-12.

On the asset side,the commercial banks' portfolio revealed two significant changes over 1967-1981 period. Both the treasury and other government securities, and loans to official entities took an increasingly larger proportion of the total assets held by commercial banks during this period. Treasury bills and other government securities which accounted for only 3.3 percent of the total assets held by the commercial banks at the end of 1967 rose to 33 percent by the end of 1981 (see table III-15).

In view of the narrowness of the capital market, commercial banks were obliged to pick up a relatively large proportion of government securities and treasury bills. Thus commercial banks have tended to become no more than what Herman calls "a bureauratic appendix of the planning and fiscal machinery"(Herman, 1968, p.507).[10]

The second significant change in the asset stucture of the commercial banks has been a sharp increase in the loans extended by commercial banks to the official entities. These loans which accounted for only 5.3 percent of commercial banks' total assets at the end of 1967, rose to about 31 percent by the end of 1970, and exceeded 40 percent of commercial banks' assets over the years of 1975-1981(see table III-15). These loans have been mainly in the form of overdrafts extended to few parastatals, known for their inefficiency, mismanagement and loss-making.[11]

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[10] This quotation is taken from Loxely(1969).

[11] The National Milling Corporation(NMC), a parastatal organization responsible for the marketing of food crops and nationalized mills, relied heavily on drawing overdrafts

F.6. Sectoral Distribution of Lending by Commercial Banks

Despite the rapid expansion in the commercial banks' holdings of treasury bills and gvernment securities, banks' lendings to the non-government sector grew quite rapidly over the 1967-1981 period. During this period, commercial banks' lendings grew at an average rate of 18 percent. table III-16 summarizes the distribution of commercial banks among various sectors of the economy.

As can be seen from table III-16, a relatively large proportion of these loans have been channeled to the marketing of agricultural produce, foreign commerce, and the manufacturing sector. Agriculture, the backbone of economy, has received only a small proportion of the loans extended by commercial banks.

Lending to agriculture accounted for only about 10-13 percent of banks'lendings during the 1967-1970 period which was subsequently reduced to less than 6 percent over the years of 1970s (see table III-15). Though part of this rapid decline in the share of agriculture in commercial banks' lending was due to the establishment of a specialzed bank,the Tanzanian Rural Development Bank(TDRB) in 1971, the share of agricuture in the total loans extended by commercial banks and the TRDB together averaged about about 8 percent of the total loans extended by commercial banks

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''(cont'd) from commercial banks in order to finance its ever growing deficits. NMC had accumulated by 1979 trading deficits of nearly Shs.2.4 billion over four years, 1976-1979(Chama Cha Mapindusi, an unpublished report prepared by the Tanzania CCM party, 1981).

Table III-16. Commercial Banks- Domestic Lendings by Industrial Sector, 1967-1981.
(percent)

End of period	Total lendings (shs.million)	Agricutural production	Mining & mfg.	Marketing of ag. production	Export of produce	Trade in capital goods	Other trade	Others(1)
1967	818	12.5	14.0	23.3	18.1	1.8	14.9	15.4
1968	899	11.1	15.8	21.5	17.7	4.6	15.2	14.1
1969	1093	10.0	17.9	24.8	12.9	3.9	16.9	13.6
1970	1347	12.7	15.9	20.8	10.3	3.9	22.5	13.9
1971	1505	5.4	14.8	26.4	7.1	2.2	30.6	13.5
1972	1549	6.2	16.5	34.3	7.4	1.4	19.7	14.5
1973	1821	4.9	19.8	31.2	3.8	1.2	27.1	12.0
1974	2899	4.0	21.7	33.7	10.1	3.2	18.7	8.6
1975	3351	4.9	26.7	29.3	9.4	2.4	18.4	8.9
1976	3670	4.2	28.3	31.1	10.9	2.7	14.6	8.2
1977	4403	3.9	32.3	27.2	16.6	1.2	9.5	9.4
1978	6249	3.0	41.0	23.8	12.1	2.8	8.4	8.9
1979	8666	3.0	24.7	44.0	6.2	1.2	9.0	11.9
1980	7400	6.0	8.9	63.1	1.4	0.3	18.7	11.6
1981	8551	5.6	6.8	63.5	4.2	0.3	9.4	10.2

Notes: (1) includes public administration, building and construction, trasport, tourism, and unspecified items.

Sources: Bank of Tanzania, Economic Bulletin, vol. xiii, December 1981.

over the 1971-1981 period. This seems to be quite small in comaparison to the contribution of agriculture to GDP and the country's import capacity.

F.7. Money, Income, and Prices

Having summarized sources of money supply creation in Tanzania over the period under study in what follows we provide an overview of the behavior of income and prices to changes in the money supply.

The money supply defined to include currency outside banks and demand deposits other than those of the government(M1) grew quite rapidly, at an average annual rate of 17.8 percent over the 1962-1981 period (see table III-17). During this period the growth of money supply showed considerable fluctuation, ranging from its lowest average annual rate of 6.7 per cent during the 1962-1966 period to its highest rate of 26 percent during the 1978-1981 period. Behavior of the money supply and prices over the five phases, 1962-1965, 1966-1971, 1972-2973, 1974-1976-, and 19778-1981 are summarized in table III-17 and Figure III-5.

During the first phase(1962-1965), the EACB, as noted earlier, pursued a quite restrictive monetary policy. During this period, the money supply(M1) grew at an average annual rate of 6.7 percent, and the economy experienced a relatively high rate of growth with little changes in the price level. As evident from table III-17, the rate of

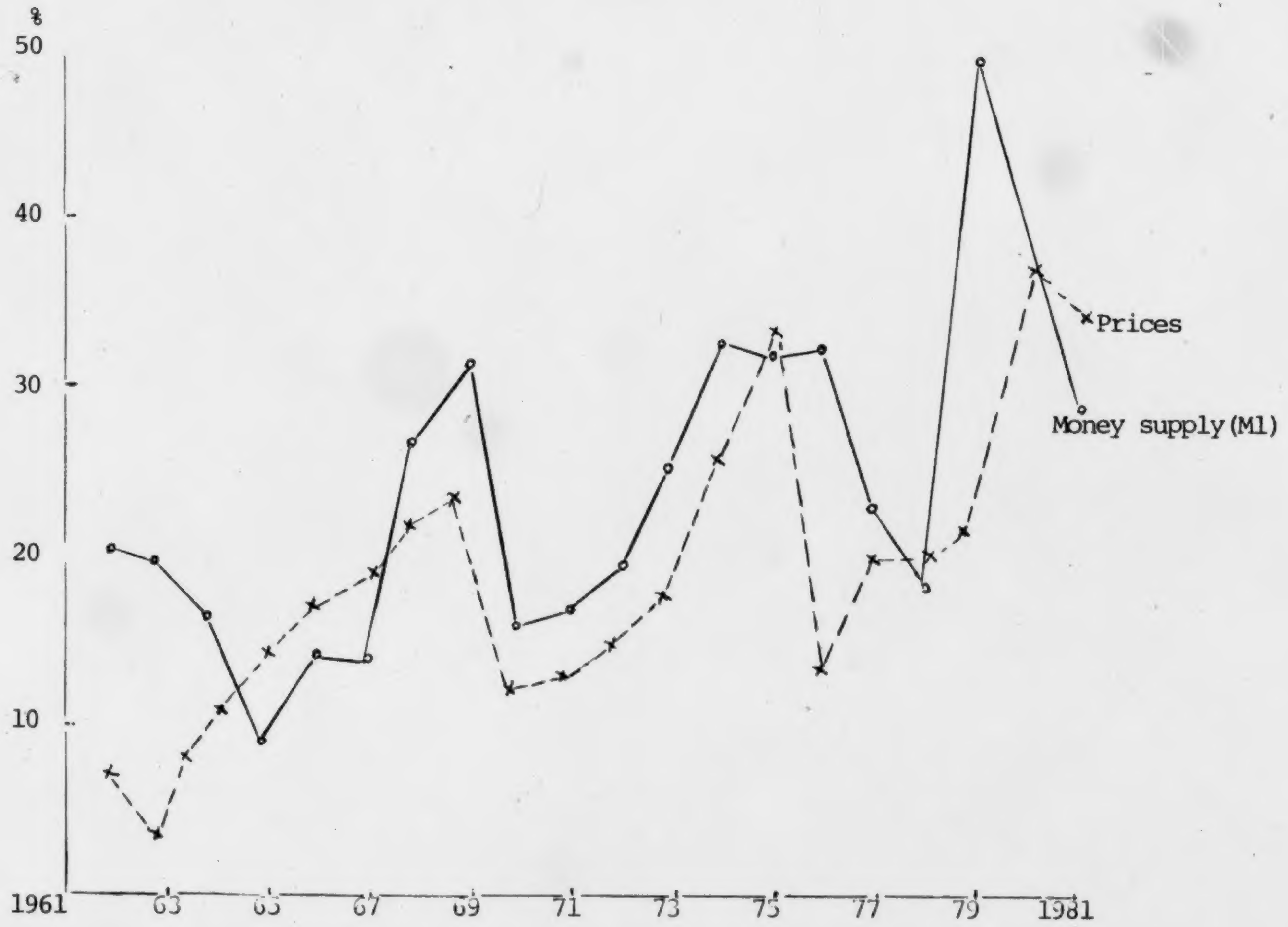
TableIII-17. Money Supply, Income, and Prices: Growth Rates, 1962-1981.
(percent)

	Annual Averages					
	1962-1981	1962-1965	1966-1971	1972-1973	1974-1976	1978-1981
Money supply(M1)	17.6	6.7	12.9	15.2	25.5	26.1
Money supply(M2)	18.0	9.6	14.6	16.4	24.7	26.4
Monetary GDP	10.8	7.3	8.6	14.9	19.3	5.4
Money-Income ratio	-	21.0(1)	28.5(2)	30.1	33.4	51.9
GDP price Deflator (1966=100)	6.8	1.7	2.0	7.2	17.3	8.3
Consumer price index (1966=100)	11.6	1.3	10.7	9.1	17.5	20.3

Notes:
(1). Includes 1962-1967.
(2). Includes 1968-1971.

Sources: Bank of Tanzania, Economic Report and Opertaion, various issues and International Monetary Fund(1967).

FigureIII-5. Year to Year Change in Prices and Money Supply,
(1962 - 1981)



Source: see table III-17.

inflation, as measured by changes in the GDP price deflator, ran at an average annual rate of only 1.7 percent.

During the second phase(1966-1971), the growth rate of the money supply almost doubled, rising from 6.7 percent in the first phase to 12.9 percent. Despite the rapid expansion in the money supply during this period changes in the price level remained quite small. The GDP price deflator rose at an average annual rate of 2 percent (see table III-17).

This relatively weak interrelationship between changes in the money supply and prices during this phase in comparison to other phases is found to be related to rises in the money-income ratio and rapid economic growth experienced by the economy (Loxely, 1971, and Rwegasira, 1976). According to the Rwegasira's estimate, increase in the income velocity of money neutralized about 38 percent of the current monetisation in the period 1967-1969, and continued to absorb over 33 percent during 1970- 1973 period(Rwegasira, 1976, p.146). The growth of output of the monetized sector is estimated to absorb a relatively large proportion, 56 percent, of the total current monetization in 1967-1969 and 29 percent in 1970-1973.

For a developing economy, such as Tanzania, an increase in the money income ratio is not surprising. The available empirical evidence for developing countries shows that at early stage of development the money-income ratio tends to rise with the economic growth (Gurley, 1967; Ezekiel, 1967;

and Short, 1973).[12]

Loxely(1971) and Rwegasira(1976) relate the rapid increase in the money-income ratio during this period to the extension in the national banking system and the monetization of the economy. As can be seen from table III-17, the money-income ratio rose considerably during the immediate years after the emergence of the national banking system and its extension to rural Tanzania (1968-1971). The annual average money-income ratio which had stood at 0.21 dring the 1962-1967 period rose to about 0.30 during this period.

The money-income ratio tended to stabilize by the beginning of 1970s. The money-income ratio showed little variation during the 1970-1973 period, and thereafter started rising again. However, the increase in the money-income ratio during this period was mainly due to the widespead shortages of consumer items and undesired accumulation of cash balances by the public rather than the development of banking facilities and the the monetisation of the economy(IBRD, 1980).

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[12] A number of reasons have been advanced in these studies to explain the behavior of the money-income ratio in LDCs. Among the main explanatory variables are, per capita income, interest rate, changes in price level, degree of the monetization of the economy, and the growth of financial intermediaries and banking habits. It is argued that there is a tendency for the average propensity to save to rise with the increase in the per capita income. Since a relatively large proportion of savings in these countries are often held in the form of money an increase in savings then tends to increase the money-inome ratio. Changes in prices and interest rate also tend to influence the money-income ratio by affecting the opportunity cost of holding cash balances by the public. An increase in the money-income ratio might be due the monetization of the economy,that is an increase in the share of output produced by the monetized sector of economy, which tends to increase the public demand for money in order to carry out the same volume of output. Finally, it is argued that money-income ratio tends to rise with the expansion in the banking facilities in rural areas of developing countries.

The money supply and prices grew at ever increasing rates during the last three phases(1972-1973, 1974-1976, 1978-1981). As evident from table III-17, the money supply(M1) grew at an average annual rate of about 15 percent, 25 percent, and 26 percent respectively during these subperiods. The rate of inflation, as measured by the changes in the consmer price index rose from about 9 percent during the the third phase(1972-1973), to 17.5 percent the fourth phase(1974-1976), and to as high as 20.3 percent in the fifth phase(1978-1981).

G. Fiscal Structure and Fiscal Policy

Beginning with the Second Five Year Development Plan(1969/1970), the deficit of the central government has been a major factor in influencing the country's monetary policy, the trend of prices, and the balance of payments. The purpose of this section is to provide an overview of Tanzania's fiscal structure and fiscal policies implemented during the period under study.

G.1. Objectives of Fiscal Policy

The objective of fiscal policy has been very much a part of the overall development strategy pursued by the government. As general objectives, public policy has been used to (i)enlarge the productive capacity of the economy by mobilizing internal and external sources, (ii)expand and improve the structure of government expenditure in order to ensure the rapid expansion of the necessary infrastructure, (iii)achieve a targeted distribution of wealth and income, and (iv)assist in the short-run problem of managing the economy.

To achieve these broad objectives, the government launched the First Three Year Development Plan(1962-1964) which was followed by three more comprehensive Five Year Development Plans(FYDP) of 1964-1969, 1969-1974, and 1976-1981. These plans called for a massive increase in government expenditure which was to be financed through the mobilization of domestic and external resources.

G.2. Public Expenditures

The public sector in Tanzania embraces the central Government and local authorities which collect and expend public funds, and parastatal corporations. Until July 1977, it also included the East African Common Services Organization(EACSO) and its successor the East African Community. Despite the rapid growth of the public sector in Tanzania little is known about its operation. This review confines itself to the operation of the Central Government for which there is sufficient information available.

In Tanzania the Central Government is the most dominant force , responsible for formulating fiscal measures, obtaining foreign loans, and spending a major proportion (about four-fifth) of total government expenditure. The following table summarizes the growth of the government sector as measured by the government expenditure and its share in GDP.

During the period under study, total government expenditure,including current and capital expenditures, grew rapidly at an average annual rate of 18.8 percent, raising the share of the government expenditure in GDP at factor cost from 13.7 percent in the Three Year Development Plan(1962-1964)to about 30 percent in the Third FYDP (1976-1981).

Because of the country's small tax base and the lack of financial independence the first two development plans relied heavily on foreign grants and loans. Foreign aid was

TableIII-18. Size and Growth of Tanzania's public Sector,1964-1981.

(percent)

	Average Annual Growth Rates				
	TYDP(1) 1961-64	1stFYDP 1964-69	2nd FYDP 1969-74	3rd FYDP 1976-81	1961-81
Total expenditures	4.4	15.2	20.4	20.5	18.8
Current expenditures	5.3	12.4	17.2	23.0	15.8
Capital expenditures	2.7	26.5	30.0	16.2	21.2
Total expenditures as % of GDP	13.7	16.9	23.0	29.8	
Capital expenditures as % of GDP	21.1	23.0	31.0	36.0	

Notes:
(1). TYDP = Three Year Development Plan.
(2). FYDP = Five Year development Plan.

Sources: Background to the Budget, Annual Economic Survey, various issues.

to provide about four-fifths of the treasury financial requirements (*Backround to the Budget*). Though foreign aid fell short of the planned targets government expenditure grew at average annual rates of 4.4 and 15.2 respectively during the the first two plans (see table III-18).

A major policy shift in the government's expenditure policy occurred in 1967 when the public sector was assigned a leading role in mobilizing and promoting economic development. The policy called for self-reliance and the establishment of a mixed economy in which the public sector is directed toward meeting the basic needs of the majority of Tanzanians in food, health, education, and shelter. This policy was more rigorously formulated in the Second and Third FYDPs (1969-1974, 1976-1981).

In contrast to the two proceeding plans the Second FYDP relied mainly on the mobilization of domestic sources. The plan envisaged a total investment of Shs.1841 million , of which about 73 percent was to be undertaken by the public sector (Second Five Year Development Plan, 1970). As table III-18 shows, government expenditure experienced its most rapid growth during this period. Total government expenditure grew at an average annual rate of 20.4 percent, raising the share of the government expenditure in GDP from about 17 percent in the First FYDP to 23 percent in the Second FYDP. This rapid rate of growth was mainly achieved by a three-fold increase in the capital component of the government expenditure.

As can be seen from table III-18, during this period, capital expenditure grew at an average annual rate of 30 percent, raising the share of capital component of the government expenditure from 23 percent in the First FYDP to 31 percent in the Second FYDP.

Faced with the balance of payments crisis of 1974-1975 and rapidly developing inflationary tendencies fiscal authorities were forced to scale down the growth of expenditure. In the fiscal year 1975/1976, the government cut public employment by 25 percent and put a break on on the growth of the capital expenditure. However, the pause in the expansion of the public sector did not last that long. The Third FYDP(1976-1981), which came into its implementation after a two year delay caused by the balance of payments crisis of 1974-1975, continued to assign the public sector a leading role in mobilizing and promoting economic growth, though at a much smaller pace than in the previous plan. During this period, the government expenditure continued to grow at the same rate as in the previous plan.

There are several factors which greatly contributed to the rapid growth of the government expenditure during this period. Firstly, the coffee boom of 1976-1977 removed one of the main obstacles to the growth of government expenditure caused by the slow growth of tax revenue and balance of payments difficlties.The rapid increase in the world price of coffee provided the government with a substantial amount of windfall revenue in the form of export taxes and foreign exchange. As can be seen from table III-18, both current and capital expenditures grew drastically in the fiscal year 1976/1977, at average rates of 44 and 26.6 percent repectively. Secondly, with the rapid development of inflationary tendencies during this period the government found it difficult to cut expenditures (at least in nominal terms). This was more so in the case of current expenditures. As a result, the current budget which had been in surplus until 1978 moved steadily into deficit over the years 1978-1981. Thirdly, the economy was faced with two external shocks, the breakdown of the EAC in 1977 and war with Uganda in 1979, which also contributed to the growth of government expenditure during this period.

Before examining the sectoral composition of the expenditure it is worth mentioning one feature of the fiscal expenditure policy which came to influence adversely the discretionary power of the fiscal authority.

Capital expenditures versus recurrent expenditures

In Tanzania, like many other LDCs, there has been a growing tendency among planners to attach more importance to the capital component of the expenditure than to recurrent expenditure. As table III-18 shows, throughout the First and Second FYDPs, the capital component of government expenditure grew at a much higher rate than the recurrent component. As a result, the share of capital expenditure in total expenditure rose from 21 percent in the Three Year Development Plan(1962-194)to about 31 percent in the Second FYDP(1969-1974), and to as high as 36 percent in the Third FYDP (1976-1981).

Several reasons are advanced in the literature to explain governments' bias towards capital expenditure in LDCs. Heller(1979) and Lim(1983) relate this phenomenon to the following two factors;

i) it is a commonly held belief by many planners in LDCs which regard capital expenditure as investment and hence as a necessary pre-requisite for rapid economic growth. Consequently, all attempts are directed towards increasing the share of public capital expenditures, often at the cost of curbing current expenditures, in order to achieve a targeted rate of growth; and

ii) governments are likely to obtain greater political benefits by having more, but less efficient projects than by having fewer, but more efficient ones. The former are, "simply more visible and so more politically rewarding"(Lim, 1983, p.377).

Fiscal policy bias towards capital expenditure has also been found to be related to the nature of foreign aid(Clark, 1978, and Wangwe 1983). To the extent that foreign aid is tied to specific projects it creates a bias in favor of the creation of new capacity rather than improving the utilization of the existing capacity.

In a recent study Wangwe(1983) indicates that there has been a growing tendency among aid donors to finance the importation of capital goods for new projects rather than financing the importation of spare parts and other expenses required for the maintenance of the existing capital. The potential magnitude of this bias can be indicated by the large share of project aid in the total aid granted to Tanzania. By 1980, project aid accounted for about 60 and 48 percent of total grants and loans granted to Tanzania respectively(SAP, 1982, p.52).

Whatever the reasons for the rapid expansion in government capital expenditure, such fiscal policy expenditure often tends to influence adversely the fiscal authority's discretionary power in two fundamental ways. Firstly, for an export economy such as Tanzania where a boom in a major export crop is typically followed by a rapid expansion in government capital expenditure, fiscal authorities as Mansfield(1980) notes, tend to lose their discretionary power over expenditures once the boom is over. To the extent that a rapid expansion in the capital expenditure establishes higher wages and salaries, and other fixed costs, it becomes difficult for the government to cut expenditures in the normal year. Secondly, as Lim(1983) pointed out, a rapid expansion in government expenditure implies a higher level of commitment on expenditure which has to be incurred by the government in order to maintain the existing capital.

Consequently, for these two reasons the "ratchet effects" of a rapid increase in capital expenditures tend to bring about a level of commitment which might be difficult to meet without creating financial instability.

G.3. Composition of Government Expenditures

Table III-19 summarizes the sectoral composition of government expenditure over the 1962-1981 period. As evident from table III-19, expenditures on social and economic infrastructure have continued to absorb a major proportion of the government expenditure throughout the period under study. Over the three FYDPs, education and health, and public utility and transportation received more than one-third of the total government expenditure. Tanzania is in fact known among LDC's in her achievement in meeting the basic needs of her population in the fields of health and education(ILO,1978).

However as the study by Clark(1978) and table III-19 suggest the government's success in the provision of social sevices has not been matched by its expenditure on the development of economic programmes for the rural area. Agriculture which is the backbone of the economy received only 9-10 percent of government expenditure over the period under study. The share of agriculture in government expenditure was increased after the food crisis of 1974-1975 when the government had to import substantial food grains. However, as table III-19 shows, the share of agriculture in

TableIII-19. Sectoral Distribution of Public Plan Outlays
(percent)

	1st FYDP 1964-69	2nd FYDP 1969-74	3rd FYDP 1976-81
General public services:	25.9	18.3	15.7
General administration	13.7	10.8	11.2
Defence	4.6	9.6	14.6
Education	14.6	13.2	13.1
Health	5.3	6.5	6.2
Economic services:	31.3	39.6	36.6
General administration	3.7	6.5	5.9
Agriculture	9.9	10.6	8.6
Mining, manufacturing & construction	0.9	2.0	7.4
Public utilities, tranportation&communication	16.5	20.5	13.5
Payments on public debts	6.6	6.6	7.7
Miscellaneous	12.2	8.3	8.9

Notes:

(1). TYDP = Three Year Development Plan.

(2). FYDP = Five Year Development Plan.

Sources: Annual Economic Survey, various issues.

government expenditure dropped in the Third FYDP.

Finally, interest payments on the public debt and defence have absorbed a growing proportion of the government expenditure. The share of these two items in the government expenditure rose from about 11 percent in the First FYDP to about 22 percent in the Third FYDP(see table III-19).

G.4. Fiscal Revenue Policy

To finance the rapid growth of public expenditure fiscal authorities made several attempts to mobilize both domestic and foreign resources. The former includes tax revenues, dividends from public corporations, and borrowing from the banking system and the public.

Table III-20 summarizes the evolution of the structure of the Tanzania's fiscal revenue. As table III-20 indicates, total recurrent revenue grew quite rapidly at an average annual rate of 16.2 percent, raising the share of the recurrent revenue in GDP at factor cost from 10.7 percent in the Three Development Plan(1962-1964) to about 19.4 percent in the Third FYDP. Recurrent revenue grew more rapidly in the Second FYDP(1969-1974) when the government undertook several tax reforms in order to expand its domestic tax base. During this period, total recurrent revenue grew at an average annual rate of 19.3 percent which is higher than 16.2 the rate of growth of the current expenditure over the same period of time. The recurrent revenue did not sustain its rapid rate of growth in the Third FYDP (1976-1981) as

TableIII-20. Sources of Current Budget Revenue
(percent)

Sources	TYDP 1961-64	1st FYDP 1964-69	2nd FYDP 1969-74	3rd FYDP 1976-81
Direct taxes	22.3	23.1	25.2	26.5
Indirect taxes	54.1	55.2	54.9	61.3
Domestic taxes on goods&services	9.8	17.4	31.2	40.8
taxes on int. trade	40.0	32. 5	23.6	19.6
Non-tax revenues	10.0	8.8	13.3	12.8
Dividents&interests	3.3	2.4	3.0	3.7
Miscellaneous	13.6	12.9	6.6	-
Total current revenue as % of GDP	10.7	14.0	17.6	18.9
Average annual growth	13.7	12.0	19.3	15.8

Notes:
(1). TYDP = Three Year Development Plan
(2). FYDP = Five Year Developmet Plan.

Sources: See TableIII-18.

the poor performance of agriculture and shortages of foreign exchange undermined the tax base of the government. During this period, recurrent revenue grew at an average annual rate of only 15 percent as compared to 23 percent rate of growth of recurrent expenditure.

Sources of Recurrent Revenue

i)Direct and indirect taxes

At independence, Tanzania inherited a quite underdeveloped tax system. In the fiscal year 1961/1962, income taxes accounted for only 3.3 percent of the GDP at current market prices, and provided about 27 percent of the government revenue(IMF, 1967, table.12).The direct tax system consisted of the East African Income Tax which applied to a tiny minority and personal and poll taxes which applied to a great majority(ILO, 1978, pp.161-162). A major proportion of revenue originated in the foreign sector in the form of import duties which accounted for 37 percent of the revenue in the fiscal year of 1961/1962(IMF, 1967, table.12). Another major source of tax revenue were excise taxes on domestically manufactured goods. These taxes accounted for about 12 percent of the revenue.

During the period under study,the government carried out several tax reforms in order to enlarge its tax base.[13] As evident from table III-20, taxes on the domestic goods and services rose drastically from as little as 17.4 percent in the Three Year Development Plan(1962-1964) to 31 percent in the Second FYDP. The share of domestic taxes on goods and services grew more rapidly in the second half of 1970s. During this period,the the government relied more and more on these taxes in order to finance its growing recurrent budget deficits. As can be seen from table III-20, the share of taxes on domestic goods and services rose to about 41 percent in the Third FYDP, and to as high as 57 percent in the fiscal year 1980/1981(*Annual Economic Survey*, 1981).

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[13] For a summary of these tax reforms see ILO(1978, pp.161-162) and Mushi(1982, pp.221-222).

In contrast to the taxes on domestic goods and services, taxes on foreign trade fared poorly over the period under study. As table III-20 indicates, the share of taxes on foreign trade declined steadily from 40 percent in the Three Year Development Plan to 32.5 percent in the First FYDP, to 23.6 percent in the Second FYDP, and to as low as 19.6 percent in the Third FYDP. The generally poor performance of foreign trade in terms of generating tax revenue can, among other factors, be related to the nature of commercial policies pursued by the government, and changes in the composition of imports.

There has been, as pointed out earlier, a tendency among policy makers in Tanzania to rely more on direct means of controlling imports such as import licensing rather than on more income generating measures such as tariffs. With regard to exports there has also been a tendency among policy makers to utilize export taxes and subsidies as policy tools to stimulate domestic production of export crops. As a result, commercial policies have tended to undermine the importance of the foreign sector as a generating source of revenue.

The decline in share of import taxes in government revenue over the period under study might also be attributed to the changes in the composition of imports. The rapid expansion of import-substituting industries in the First and Second Development Plans reduced the share of consumer goods considerably in total imports in favor of intermediate and capital goods (see table III-5). The increase in the share of capital goods in total imports reduced revenue from import taxes, since these goods were generally subject to a lower tariff rate than imported consumer goods, and they were often subject to duty exemption.

Finally the decline in the share of foreign trade taxes in total revenue can be related to the general slow growth of trade caused by the poor perfomance of agriculture and foreign exchange shortages in the second half of 1970s.

Dividends and Interest

Dividends and interest payments by the government's partially- and wholly-owned enterprises constitute another source of revenue. Despite the rapid expansion in the parastatal sector in post Arusha period, the contribution of this sector to the government's revenue has remained quite insignificant, amounting only to 3 percent of recurrent revenue throughout the 1970s (see table III-2). Many parastatals have recently been critized for their general poor performance(IBRD, 1977 and 1980; Lim, 1981).

G.5. Deficit Financing and Domestic Borrowing

Despite many structural changes in the tax system and the rapid growth of tax revenue during the period under study, recurrent revenue has been more or less sufficient to cover recurrent expenditures. Government saving, defined as the difference between recurrent revenue and expenditure, accounted for only 4.7 percent of the government capital expenditure over the 1962-1981 period. Capital expenditures grew at an average annual rate 21 percent, raising total capital expenditure from Shs.406 million or 2.9 percent of GDP in the Three Year Development Plan to Shs.20562 million or 12.8 percent of GDP in the Third FYDP (see table III-18).

To meet these large deficits, fiscal authorities had recourse to internal and external sources of funds. Table III-21 shows the relative importance of the government's sources of borrowing.

TableIII-21. Development Budget and Sources of Finance (1961 - 1981)

	TYDP 1961-64	1st FYDP 1964-69	2nd FYDP 1969-74	3rd FYDP 1976-81
Capital expenditures: (million Shilling)	406	1530	4384	2056
As % of GDP	0.9	4.6	8.3	12.9
Financed by: (percent)				
Domestic sources	35.3	66.0	64.8	55.8
Recurrent surpluses	1.0	20.6	11.8	-11.2
Borrowing:				
Banking system	-	-	29.6	39.0
Other financial institutions	-	-	18.8	13.0
Others(3)	-	-	4.4	12.4
External sources:	64.6	34.0	35.2	44.8
Loans	20.9	30.4	29.6	20.4
Grants	43.7	3.6	5.6	24.4

Notes:
(1). TYDP = Three Year Development Plan
(2). FYDP = Five Year Developmet Plan.
(3). Includes mainly short-term borrowing from Bank of Tanzania.

Sources: Background to the Budget and Annual Economic Survey, various issues.

Domestic Borrowings

In the absence of a developed capital market in Tanzania the treasury's financial requirements have been primarily met by the Bank of Tanzania, commercial banks, and non-bank financial institutions.

Prior to the establishment of the Bank of Tanzania in 1966 and the nationalization of commercial banks the government, as already pointed out, had limited access to the financial resources of the banking system. Government accounts with commercial banks was mainly limited to transactions carried out in connection with the annual budget. In fact, the government maintained a net credit position with commercial banks over the 1962-1967 period(IMF, 1967, p.269). As table III-21 shows, domestic borrowings accounted for only 3 percent of the capital expenditures during the Three Year Development Plan.

The establishment of the Bank of Tanzania and the reorganization of the commercial banks and other non-bank financial institutions provided the government with a vehicle to increase its command over resources via these financial institutions. As evident from table III-21, these financial institutions contributed about 48 percent of the financial requirements of the treasury in the Second FYDP and about 57 percent in the Third FYDP. Nonbank-financial institutions,(mainly The National Insurance Company and the National Provident Funds), were the major holders of government stocks and bonds, followed by commercial banks.

As can be seen from table III-22, the former held on average between 30-48 percent of the government stocks and bonds and the later about 11-25 percent during the Second and Third FYDPs.

With the rapid deterioration in fiscal balances in the second half of 1970s, commercial banks found themselves in a forced position to accommodate the treasury financial requirements. During the fiscal years 1978/1979 to 1980/1981 treasury bills accounted for about 22, 17, and 11 percent of the total assets held by commercial banks (*Bank of Tanzania, Economic Bulletin*, December 1981).

Finally, the Bank of Tanzania, as a government banker and a lender of last resort, was left with little choice except to accommodate the treasury financial requiremets.

G.6. Foreign Financing

As table III-21 shows, loans and grants contributed about one-third of the treasury financial requirements in the first two FYDPs and about 45 percent in the Third FYDP. Foreign sources include mainly concessionary loans, obtained from official sources, and grants.

The increase in foreign aid, especially during the Third FYDP enabled the government to overcome the major difficulties in the balance of payments without seriously depressing the domestic economy. The argument usually put forward for such stabilization programmes is that foreign and fiscal imbalances experienced by Tanzania and many other

TableIII-22. Central Government Stock and Bonds by Holders

(percent)

Holder	1st FYDP(1) 1964-1969	2nd FYDP(2) 1969-1974	3rd FYDP(3) 1976-1981
Bank of Tanzania	6.9	6.4	35.4
Commercial banks	10.8	23.2	24.7
Non-bank financial institutions	48.1	43.6	29.9
East African Community	7.2	6.2	3.6
Other public institutions	26.7	12.9	4.1
Private	0.6	7.6	2.2
Total	100.0	100.0	100.0

Notes:
(1) FYDP = Five year Development Plan.
(2) Includes only the last four years of the plan.

Sources: Compiled from Bank of Tanzania, Economic Bulletin, vol. xiii, December 1981.

LDCs in 1970s are merely structural ones, resulting from their unfavorable terms of trade with the rest of world and world recession rather than excessive domestic demand (Green, and et al., 1980, and Dell, 1980). The cost of adjustment via government expenditures is too costly for an economy which has already been experiencing slow growth and high unemployment. Therefore, it is argued that deficits in balance of payments and government budget are better handled through a long-term structural adjustment programme which is supplemented by short-term foreign financing. Implementation of such a stabilization programme would then smooth out the process of adjustment until those long-term structural alterations can take place.

H. Summary

The central theme of this chapter has been to present a general overview of Tanzania's economic conditions and policies implemented over the 1962-1981 period, with special reference to the Tanzania's balance of payments, and fiscal and monetary structure.

Throughout the 1960s, Tanzania enjoyed relatively rapid economic growth with few change in prices. During this period, both the monetary and fiscal authorities had little influence on the money supply and financial resources of the banking system. The money supply was mainly determined by the country's balance of payments, and the power of fiscal authorities was, to a large extent, checked by their limited accessibility to the financial resources of the banking system, by the narrow domestic tax base, and by bottlenecks in Tanzania's infrastructure.

A major policy shift in government's fiscal and monetary policies occurred in 1967 when the public sector was assigned a leading role in mobilizing and promoting economic development. Both recurrent and capital expenditures grew at an average annual rate of 20.5 percent, raising the share of government expenditure in GDP from about 17 percent in the First Five Year Development Plan (1969-1974) to as high as 30 percent in the Third Five Year Development Plan (1976-1981). Government was successful in meeting the basic needs of rural population in the field of health and education. However, government was less successful in developing economic programs for the rural area. Agriculture, the major important sector in terms of its contribution to GDP and export earnings, was assigned a small proportion of expenditures while public administration was absorbing a relativey large and growing proportion of government expenditures.

Despite a rapid increase in domestic tax revenue fiscal authorities relied increasingly on domestic borrowing and foreign aid to finance large fiscal imbalances. The monetary policy of the Bank of Tanzania (central bank) and of the government which controlled it to an increasing extent, was directed primarily to assist in the economy's reaching the overly-ambitious goals set by the plans. The result of these changing policies was a drastic increase in the Bank's net claims on the government, depletion of Tanzania's meager foreign reserves, and rapid change in the money supply and prices. During this period the economy was also faced with a number of external shocks, such as drought, break-down of the EAC, and war, which added to already growing inflationary demand pressures.

With the rapid growth of domestic demand Tanzania's balance of payments moved increasingly into deficit. The trade account which had showed a favorable balance over the 1960s period deteriorated rapidly throughout the 1970s. Even though balances on net services and tranfers showed marked improvements during this period, they were not sufficient to cover an ever-widening gap between Tanzania's exports and imports.

Both the government's agricultural and industrial policies were found out to be mainly responsible for the poor performance of Tanzania's trade balances. Tanzania's traditional export crops which accounted for more than two-third of total exports fared poorly in terms of quantity growth; and little attempts were made at building up new crops. Despite the government's recognition of the importance of agriculture in Tanzania's economy the agricultural sector was neglected. Agriculture received a small proportion of the public expenditures and credits extended by commercial banks. Planners also made few attempt at formulating a comprehensive pricing policy which could stimulate the production of both export and food crops. In view of little adjustment in the exchange rate and of growing administrative and marketing costs of crop authorities farm producers had to face a rapid deterioration in their purchasing power.

Industrial strategies pursued by the government tended to place emphasis on domestic market and few attempts were made to formulate an export strategy with regard to the manufacturing sector. Industrial projects were mainly evaluated and approved without considering their implications for the country's balance of payments. In fact industrial strategies led to the establishment of a large number of industrial ventures which were, on the average, more import-oriented and less export oriented than the average-size manufacturing firms.

With regard to commercial policies, little use was made of the exchange rate instrument. Exchange rate was generally regarded by Tanzania policy makers as inferior to direct exchange control, import licensing, and import and export taxes and subsidies.

To fill growing trade imbalances the government relied heavily on foreign aid. Tanzania was, at least until very recently, able to obtain a substantial amount of foreign aid without compromising her long-term goals. This enbabled the government to overcome fiscal and trade imbalances without depressing the domestic economy seriously. However, the rapid deterioration in trade and fiscal balances and limited availibility of foreign aid to Tanzania has recently led the government to a reappraisal of the past development strategy. It has also singled out the need for a more systematic coordination between the available financial and physical resources and domestic demand management.

IV. A MONETARY MODEL OF THE BALANCE OF PAYMENTS ADJUSTMENT

The aim of this chapter is to construct a short-run monetary model of Tanzania's balance of payments. The monetary approach to the balance of payments provides the context in which this study approaches and interprets the role of monetary and real variables in the balance of payments adjustment. The basic model developed in this study involves a fourteen-equation simultaeous system with the following main features:

i) The model defines the balance of payments on both current and capital accounts and takes explicitly into account one aspect of the-balance-of-payments stock-adjustment suggested by Prais(1962) and Dornbusch(1973).

ii) The behavior of the monetary and fiscal authorities are explicitly modelled by defining a central bank reaction function and a deficit financing equation.

iii) Real income and changes in prices are permitted to fluctuate and their behaviors are hypothesized by specifying a commodity market aggregate demand equation and an inflation equation. The model consists of four sectors: foreign sector, financial sector, fiscal sector, and a commodity market. There are seven behavioral equations and seven identities which determine simultaneously imports, primary exports, the expected rate of inflation, domestic credit, treasury financing requirements, changes in prices, real income, aggregate expenditures, nominal stock of the money supply, foreign reserves, government expenditures, and nominal exports.

A. The Complete Model

The full structure of the model, along with definitions of the variables, is shown table IV-1. The behavioral equations are specified as linear in semi or full logarithms of the variables. For the economy of notation and space, the error terms are omitted.

TableIV-1. Specification of the Complete Model.

I) Balance of payments

$$\Delta IR = X - Z.ZP.R + NKI$$

II) Total nominal exports

$$X = PX.PXP.R + NPX.NXP.R$$

III) Imports

$$\log(Z) = \lambda_1 z_0 + \lambda_1 z_1 \log(ZP.R/P) + \lambda_1 z_2 \log(AE) + \lambda_1 z_3 \log(X/ZP) + (1 - \lambda_1)\log(Z)_{-1}$$

$$z_1 < 0;\ z_2,\ z_3 > 0;\ \lambda_1 > 0$$

IV) Primary exports

$$\log(PX) = \lambda_2 x_0 + \lambda_2 x_1 \log(PXP.R/P)_{-1} + \lambda_2 x_2 \Delta\log(Y) + \lambda_2 x_3 \log(Yw) + (1 - \lambda_2)\log(PX)_{-1}$$

$$x_1,\ x_2,\ x_3 > 0;\ \lambda_2 > 0$$

V) Money supply

$$MS = m(IR + DC)$$

VI) Expected rate of inflation

$$\Delta\Pi = \Theta[\Delta\log(P) - \Pi_{-1}]$$

$$0 < \Theta < 1$$

VII) Central bank reaction function

$$\log(DC) = h_0 + h_1\log(Y) + h_2[\log(Y) - \log(Y)^*] + h_3[\log(IR) - \log(IR)^*] + h_4\log(TFR) + h_5 DUM1$$

$$h_1,\ h_2 < 0;\ h_3,\ h_4 > 0$$

TableIV-1. (cont'd). Specification of the Complete Model.

VIII) Treasury financing reqiurements

$$\log(TFR) = \lambda_3 t_0 + \lambda_3 t_1 \Delta\log(P) + \lambda_3 t_2 \log(IDE)$$
$$+ \lambda_3 t_3 [\log(Y) - \log(Y)^*] + (1 - \lambda_3)\log(TFR)_{-1}$$
$$+ \lambda_3 t_4 DUM2 + \lambda_3 t_5 DUM3$$
$$t_1,\ t_2,\ t_4 > 0;\ t_3 < 0;\ \lambda_3 > 0$$

IX) Private expenditures

$$\log(PE) = \lambda_4(e_0 - e_2.a_0) + \lambda_4(e_1 - e_2.a_1)\log(Y)$$
$$- \lambda_4\ e_2\ a_2\Pi + \lambda_4\ e_2\log(MS/P)_{-1}$$
$$- (1 - \lambda_4)\log(PE)_{-1}$$
$$e_1,\ e_2,\ a_1 > 0;\ a_2 < 0;\ \lambda_4 > 0$$

X) Inflation

$$\Delta\log(P) = p_0 + p_1\Delta\log(MS) + p_2\Delta\log(MS)_{-1} + p_3\Delta\log(Y)$$
$$+ p_4\Delta\log(ZP.R) + p_5\Delta\log(W) + p_6\Delta\log(ITX)$$
$$+ p_7\Delta\log(TS)_{-1} + p_8 DUM2 + p_9 DUM3$$
$$p_1,\ p_2,\ p_4,\ p_5,\ p_6,\ p_8,\ p_9 > 0;\ p_7 < 0;\ p_3 \gtrless 0$$

XI) Real income

$$Y = AE + PX + NPX - Z$$

XII) Aggregate expenditures

$$AE = PE + GE$$

XIII) Nominal government expenditures

$$GE.P = TFR + DR$$

XIV) Real government expenditures

$$GE = GE.P/P$$

DEFINITION OF VARIABLES

Endogenous

IR	nominal level of international reserves
PX	real primary exports
Z	real imports
AE	real aggregate expenditures
Y	real income
MS	nominal stock of money
M	nominal demand for the stock of money
DC	domestic credit of the banking system
TFR	nominal treasury financing requirements
$\Delta\log(P)$	rate of inflation
PE	real private expenditures
Π	expected rate of inflation
GE	real government expenditures
GE.P	nomial government expenditures
P	domestic price level
H	monetary base
X	nominal exports

Exogenous

PXP	primary export prices (in foreign currency)
NXP	non-primary export prices (in foreign currency)
NPX	real non-primary exports
R	exchange rate, index of units of domestic currency per unit of foreign currency

ZP	import prices (in foreign currency)
NKI	nominal net capital inflow (in domestic currency)
Yw	index of world real industrial output
m	money multiplier
Y^*	full capacity output
IR^*	nominal desired stock of international reserves
IDE	nominal implicit fiscal deficits
DR	nominal government domestic revenues
W	index of wage rate
TS	real supply of goods available to the domestic economy
ITX	nominal indirect taxes
DUM1	dummy variable (East African Currency Board); from 1962-1965 = 1; otherwise, 0
DUM2	dummy variable (drought); from 1974-1975 =1; otherwise, 0
DUM3	dummy variable (war); from 1979-1980 =1; otherwise, 0

B. Foreign Sector

$$\Delta IR = X - Z.ZP.R + NKI \qquad \text{(IV-1)}$$

$$X = PX.PXP.R + NPX.NXP.R \qquad \text{(IV-2)}$$

$$\begin{aligned} \log(Z) = {} & \lambda_1 z_0 + \lambda_1 z_1 \log(ZP.R/P) + \lambda_1 z_2 \log(AE) \\ & + \lambda_1 z_3 \log(X/ZP) + (1 - \lambda_1)\log(Z)_{-1} \\ & z_1 < 0;\ z_2,\ z_3 > 0;\ \lambda_1 > 0 \qquad \text{(IV-3)} \end{aligned}$$

$$\begin{aligned} \log(PX) = {} & \lambda_2 x_0 + \lambda_2 x_1 \log(PXP.R/P)_{-1} + \lambda_2 x_2 \Delta\log(Y) \\ & + \lambda_2 x_3 \log(Yw) + (1 - \lambda_2)\log(PX)_{-1} \\ & x_1,\ x_2,\ x_3 > 0;\ \lambda_2 > 0 \qquad \text{(IV-4)} \end{aligned}$$

Equations IV-1 through IV-4 describe the behavior of foreign reserves, imports and the primary exports. Equation IV-1 is an identity, showing the balance of payments, defined as the changes in net foreign asset holdings of the consolidated banking system (IR), as the sum of the excess of nominal exports (X) over nominal imports (Z.ZP.R) and the net inflow (NKI). The latter is here assumed to be determined exogenously. There are basically two reasons for making this assumption in the context of a developing country such as Tanzania. First, Tanzania, like other developing countries, has a limited borrowing power in the world capital market and, second, capital flows are generally controlled by the government. During the period under study, capital inflows were overwhelmingly in the form of transfers.

It should be noted that equation IV-1 defines the balance of payments in terms of current and capital accounts rather than with the official or monetary account normally in the used monetary approach. However, this definition of the balance of payments is consistent with the monetary approach provided that the monetary variables are explicitly incorporated into the balance of payments adjustment process.(see Johnson, 1977a).

Equation IV-2 is an identity, showing nominal exports as the sum of primary and non-primary exports.

I. Demand for Imports

$$\begin{aligned} \log(Z) = {} & \lambda_1 z_0 + \lambda_1 z\lambda \log(ZP.R/P) + \lambda_1 z_2 \log(AE) \\ & + \lambda_1 z_3 \log(X/ZP) + (1 - \lambda_1)\log(Z)_{-1} \\ & z_1 < 0;\ z_2,\ z_3 > 0;\ \lambda_1 > 0 \qquad \text{(IV-3)} \end{aligned}$$

The simple formulation of an import demand equation relates the quantity demanded to the ratio of import price to domestic price and to real income or expenditures (Houthakker and Magee, 1969; and Kendy and Thirwall,1979). However, in the context of the Tanzanian economy, as in many other developing economies, the above formulation of import demand involves several incorrect specifications. Implicit in such a formulation of import demand are assumptions that the price elasticities of the supply of imports are infinite and the supply of imports adjusts itself instantaneously to the desired demand for imports. These assumptions are not generally met by many developing countries. First, imports are more often subject to various quantitative restrictions and exchange controls. These restrictions are mainly imposed to maintain a disequilibrium system with overvalued exchange rates and severe foreign-exchange constraints. Second, there are usually various tedious bureaucratic procedures and time lags which delay adjustment of actual imports to adjust to their desired levels.

In order to allow for these quantitative restrictions and adjustment lags, the following steps are taken.

1. A variety of proxies for import control measures are included in the import equation. The net foreign financial assets of the banking system, import capacity of exports, and the level of international reserves are frequently used in empirical studies as proxies for import controls(Klein et al, 1961; Dutta, 1964; and Turnovsky, 1968). The rationale behind the use of such variables is, as Turnovsky noted, the implied existence of a government policy reaction function in which the level of quantitative restrictions on imports varies inversely in relation to one of the proxies. The import restrictions are, then, imposed in accordance with the foreign exchange position of the country.

The desired level of the real demand for imports (Z^*) is thus specified as a log linear function of real aggregate expenditues (AE), the ratio of import prices (in domestic prices) to the domestic prices (ZP.R/P), and the import capacity provided by export earnings (X/ZP).

$$\log(Z)^* = z_0 + z_1\log(ZP.R/P) + z_2\log(AE) + z_3\log(X/ZP)_{-1} \qquad \text{(IV-3.1)}$$

where Z^* is the desired level of demand for real imports, AE real aggregate expenditures, and other variables are defined as before.

ii)Because of bureauratic and other lags, actual real imports are assumed to adjust to their desired level according to the following adjustment mechanism

$$\Delta \log(Z) = \lambda_1[\log(Z)^* - \log(Z)_{-1}] \qquad \text{(IV-3.2)}$$

where λ_1 is the coefficient of adjustment. The higher the value of λ_1, faster is the speed of adjustment. Substituting equation IV-3.1 into IV-3.2 and solving for actual imports, we obtain

$$\begin{aligned} \log(Z) = {} & \lambda_1 z_0 + \lambda_1 z_1 \log(ZP.R/P) + \lambda_1 z_2 \log(AE) \\ & + \lambda_1 z_3 \log(X/ZP) + (1 - \lambda_1)\log(Z)_{-1} \\ & z_1 <0;\ z_2,\ z_3>0;\ \lambda_1>0 \end{aligned} \qquad \text{(IV-3)}$$

Equation IV-3 expresses real imports (Z) as a negative function of relative import prices (ZP.R/P), and a positive function of real aggregate expenditures (AE), of previous period level of real imports, and of real export earnings (X/ZP).

It should be noted that the import equation IV-3 specifies imports as a function of real expenditures rather than real income. The rationale behind the inclusion of expenditures in the import equation is that the demand for foreign goods and services, as Rhomberg(1965) and Mundell(1971) pointed out, should properly be related to total domestic expenditures on all goods and services and not to expenditures on domestically produced goods and services as the use of income as an explanatory variable would imply. Relating imports to income , as Kennedy and

Thirwall(1979) noted, also assumes explicitly either (a)all expenditures have the same ratio of imports to expenditure or (b)all imports are consumption goods. These assumptions are too rigid.

II. Supply of Primary Exports

$$\log(PX) = \lambda_2 x_0 + \lambda_2 x_1 \log(PXP.R/P)_{-1} + \lambda_2 x_2\ \Delta\log(Y)$$
$$\lambda_2 x_3 \log(Yw) + (1 - \lambda_2)\log(PX)_{-1}$$
$$x_1,\ x_2,\ x_3>0;\ \lambda_2>0 \qquad \text{(IV-4)}$$

Exports were one of the most volatile components of aggregate demand over the period under study. The annual growth rate for the volume of primary exports ranged from as low as -9.2 percent to as high as 23.9 percent over the period 1961-1981. The average annual growth rate and the standard deviation were 2.8 and 8.9 percent respectively. Export performance also varied considerably across the export crops.(See chapter III). Under such circumstances, it would be desirable to specify an export equation for each main primary commodity group. However, this is beyond the scope of this study, considering the highly aggregated nature of our model and the limitations of data.

Equation VI-4 describes the behavior of Tanzania' s exports of six major primary crops to the rest of the world. These export crops, accounting for about two-thirds of Tanzania total exports, are coffee, cotton, tea, tobacco, cashewnuts, and cloves. Exports of sisal and manufactured products are here regarded as exogenous, with values determined outside the model.

Sisal was excluded from the list of the primary export crops mainly for two reasons. First, unlike the other export crops for which Tanzania was a small producer in the world market, Tanzania was one of the world's largest exporters of sisal. Therefore, the volume of sisal exported was mainly determined by world demand rather than domestic supply conditions. Second, the world price of sisal showed considerable fluctuations over the period 1964-1981 while the volume of output was rapidly declining over the same period (See chapter III).

Exports of manufactured products are assumed exogenous. Manufactured exports, as pointed out earlier, were mainly dominated by two items, sisal cords and diamonds; the rest are spread among a large number of manufactured products with a relatively high import content. The volume of manufactured exports then tends to vary more with the availability of imported industrial raw materials and capital goods rather than with domestic supply conditions.

Since Tanzania is a small economy relative to the rest of the world, it is assumed that primary export prices (in foreign currency) are determined exogenously in the world market and primary export crops supplied are determined by the domestic conditions. The general formulation of export equation IV-3 is basically derived from Behrman(1977). The volume of primary exports (PX) is hypothesized to vary with relative prices (PXP.R/P), quantitative supply and demand considerations, and primary exports lagged one period. More specifically, the desired supply of primary export crops is assumed to vary positively with relative export prices, capacity to produce exports, and the world demand. The latter two variables are here measured by the rate of growth of total output(Y) and by the index of industrial production for Tanzania's five leading trading partners (Yw).

$$\log(PX)^* = x_0 + x_1\log(PXP.R/P) + x_2\log(Y) + x_3\log(Yw) \qquad \text{(IV-4.1)}$$

Real primary exports (PX) are assumed to adjust to the conditions of excess supply according to the following partial adjustment mechanism

$$\Delta\log(PX) = \lambda_2[\log(PX)^* - \log(PX)_{-1}] \qquad \text{(IV-4.2)}$$

where λ_2 is the coefficient of adjustment and Δ the first difference operator. Substituting equation IV-4.1 into equation IV-4.2 and solving for log(PX) yields

$$\begin{aligned}\log(PX) = {} & \lambda_2 x_0 + \lambda_2 x_1\log(PXP\ R/P)_{-1} + \lambda_2\ x_2\Delta\log(Y) \\ & + \lambda_2 x_3\log(Yw) + (1 - \lambda_2)\log(PX)_{-1} \\ & x_1,\ x_2,\ x_3>0;\ \lambda_2>0 \qquad \text{(IV-4)}\end{aligned}$$

That is, as the relative price of exports rises, it is more profitable to divert production from domestic to foreign markets. Relative prices enter the supply equation with a one-period lag. This reflects the marketing board or crop authorities' pricing policy according to which prices of export crops are announced at the beginning of the cropping season. In addition to prices, an increase in the economy's capacity to produce exports is also postulated to bring about a rise in primary exports, at least to the extent to which economic growth adds to the productive capacity of the agricultural sector.

C. Money Market: The Demand for Money and the Process of Money Creation

$$MS = m(DC + IR) \qquad \text{(IV-5)}$$

$$\begin{aligned} \log(DC) = {} & h_0 + h_1\log(Y) + h_2[\log(Y) - \log(Y)\ ] \\ & + h_3[\log(IR) - \log(IR)\ ] + h_4\log(TFR) \\ & + h_5 DUM1 \\ & h_1, h_2 < 0;\ h_3, h_4 > 0 \qquad \text{(IV-6)} \end{aligned}$$

A basic difference in the macroeconomics of advanced and less developed countries relates to the behavioral and structural differences prevailing in financial markets. Financial markets of LDCs are quite underdeveloped; the use of money is not as widespread and financial intermediation is not as varied and complex as in developed countries; a substantial proportion of consumption and income originate through non-monetary transactions; the ratio of financial assets to the nation's wealth or GNP is generally low; self-financing of investment is prevalent; the array of financial assets is limited and the choice of wealth holders is often confined between cash and physical assets. In short, financial markets of LDCs are generally characterized by what Myint refers to as "financial dualism." The money market consists of one small, organized and highly complex market which works alongside an unorganized market. The former is typically dominated by a few large commercial banks, insurance corporations and other modern financial intermediaries. In contrast, the unorganized market is dominated by hetergeneous private dealers ranging from shopkeepers and money lenders to landowners.

C.1. Demand for Money

$$\log(M/p) = a_0 + a_1 \log(Y) + a_2 \Pi \qquad \text{(IV-5a)}$$

Crucial to the monetary approach to balance of payments is the assumption that there exists a long-run stable demand for money which could be expressed as a function of a few variables. This raises two questions concerning an appropriate definition of money and specification of the demand-for-money equation. There is no general consensus concerning the appropriate definition of money either for LDCs or developed countries. Metzler(1963) suggests that whichever form of money demand proves to behave in a more stable fashion in relation to variables in the real sector could be considered as the appropriate definition. Friedman and Meiselman(1963) provide a more specific method for identifying the relevant variables of the real sector to which the money is highly correlated. Friedman and Meiselman suggest that a money substitute should be included in narrow money, M1, (defined as currency and demand deposits), if income is more highly correlated with the sum of the money substitutes and the narrow money than with each separately. While these considersations, as Coats and Khatkhate(1980) observe, "provides some preliminary guidelines, it should be obvious that there is no compelling a priori reasons for accepting one or another definition of money," (Coats and Khakhate, 1980, p. 12.)

The empirical results are also inconclusive. While Villanueva and Arya(1972) provide strong support for a broad definition of money, Conlisk(1970) produces evidence that a narrow definition of money is preferred to the definition which includes time and saving deposits. Aghevli(1977) also tests both the narrow and the broad definition of money over Indonesian data. The result shows that "it is difficult to choose between the two specifications of money for real cash balances on the basis of the fit of the equation since the R^2 coefficient is 0.99 for both definitions of money supply," (Aghevli, 1977, p. 46.) These comments suggest that a meaningful choice of an appropriate definition of money is an empirical question.

The demand for real cash balances is generally formulated as a function of real income and the opportunity cost of holding these cash balances. In financially developed economies, the opportunity cost of holding cash balances is presented by the yield on alternative financial assets,i.e. by the rate of interest. However, in developing economies, it is widely accepted that the real interest rate is not an appropriate measure of the opportunity cost of holding cash balances (Park, 1973; Agevli and Khan 1980; Ghatak, 1981; and Khan and Knight; 1981). The use of the interest rate as a measure of the opportunity cost of holding cash balances is considered to be inappropriate, for at least the following reasons;

i) limited size of the organized financial market;
ii) the institutional pegging of nominal interest rates;
iii) limited array of financial assets; and
(iv) limited degree of substitution between money and financial assets in comparison with the financially developed economies(Ghatak, 1981, p. 27.)

In the absence of a well-developed financial market, Myint(1971), Polak(1957), Polak and Argy(1971), contend that a simple version of the quantity theory which includes income as the only independent variable in the demand-for-money equation is more appropriate to LDCs than the Keynesian liquidity theory. Since money is predominately held for transaction purposes in LDCs the demand for money tends to be interest inelastic and the LM-schedule (money-market-equilibrium schedule) vertical.

However, it has been observed that the velocity of money is subject to more short-run variations in LDCs than in developed countries. Therefore, such an application of a naive quantity theory of money might be inappropriate to LDCs. There has, recently, been a growing literature aimed at searching for alternative forms of money-demand equations, (Diz,1970; Campbell, 1970; Fan and Liu, 1971; Abe et al. 1975; Wong, 1975; and Aghevli and Khan, 1980). These studies have primarily focused on the measurement of the opportunity cost of holding money in LDCs. It is argued that the observed nominal interest rates are, for reason mentioned above, radically different from market rates and the opportunity cost of holding money is better measured by the inflation rate or the expected rate of inflation.

In the absence of a well-developed financial market and an institutionally inflexible nominal rate of interest, the choice of wealth holders is mainly confined between money and physical assets such as agricultural products, durable consumption goods, gold, and real estate. Under such circumstances, as Aghevli and Khan noted, "it would be more appropriate to represent the opportunity cost argument in the demand for money function by the implicit return on goods -- namely, the expected rate of inflation," (Aghevli and Khan, 1980, P. 688.)

In addition to the opportunity cost of holding cash balances, the demand for money also depends on real income. The latter reflects the transactions motive for holding money. The demand for money is then specified as

$$\log(M^*/p) = a_0 + a_1\log(Y) + a_2\Pi \qquad \text{(IV-5a)}$$

where the desired demand for real cash balances(M^*/P) is positively related to real income(Y) and negatively to the expected rate of inflation(Π). The coefficients a_1 , and a_2 are the income and the inflation rate elasticities of the demand for money.

The expected rate of inflation is generated by an adaptive expectations process in which expectations are assumed to be revised proportionally to the difference between the actual rate of inflation and expected rate of inflation in the previous period

$$\Delta\Pi = \Theta[\Delta\log(P) - \Pi_{-1}] \qquad \text{(IV-6)}$$

where Δ is a difference operator, Θ the coefficient of adjustment and other variables are defined as before. The coefficient of adjustment measures the extent to which the revision of expectation responds to the error.[14]

The expected rate of inflation will be generated from equation IV-6 independently from the simultaneous model.

C.2. The Money Supply

$$MS = m(IR + DC) \qquad \text{(IV-5)}$$

Having determined the most appropriate definition of money, the second step is to examine factors influencing the behavior of the money supply and how the monetary authority influences the money supply process.

Under a fractional reserve system, the nominal supply of money (MS) is determined by the stock of high-powered money (H) or monetary base, and the money multiplier($\tilde{m}$). Following Friedman and Schwartz(1963), the relationship between the money stock and its main determinants can be derived by taking the following steps:

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[14] It should be noted that despite the theoretical problems inherent in the adaptive-expectations mechanism it has been widely used in empirical studies in demand for money in LDCs (For a review of the literature see Wong, 1977 and Ghatak,1981). Considering the limited availability of data in many developing nations, the adaptive expectations model appears to be easier to work with than other possibly superior models, such as rational expectations.

$$MS = m.H \tag{IV-5.1}$$

$$MS = CU + DD + TD \tag{IV-5.2}$$

$$H = CU + BR \tag{IV-5.3}$$

where CU is currency in circulation outside banks, DD demand deposits, TD time deposits, BR banking reserves, and H stock of high-powered money. Identity IV-5.1 defines the stock of money supply and IV-5.2 and IV-5.3 the actual money supply and monetary base in terms of main liabilities of the banking system. Dividing IV-5.2 by IV-5.3 yields:

$$MS/H = \frac{CU + DD + TD}{CU + BR} = \frac{\frac{DD + TD}{BR}\left[1 + \frac{DD}{CU}\left(1 + \frac{TD}{DD}\right)\right]}{\frac{DD + TD}{BR} + \frac{DD}{CU}\left(1 + \frac{TD}{DD}\right)}$$

$$= \frac{c[1 + a(1 + b)]}{c + a(1 + b)} \tag{IV-5.4}$$

where c denotes the ratio of total deposits to reserves and a and b are respectively, the ratio of demand deposits to currency and the ratio of time deposits to demand deposits. Substituting IV-5.4 into IV-5.1 we obtain

$$MS = c[1 + a(1 + b)]/[c + a(1 + b)]\ H \tag{IV-5.5}$$

The above formulation of the money supply suggests that a change in the stock of money can be attributed to a change in any one, a combination of, or all four determinants of the money supply, namely, monetary base (H), the proportion in which the public chooses to hold deposits (including both demand and time deposits), and the reserve ratio. Of the four determinants of the money supply the monetary base is here taken to be endogenous and the remaining three are assumed to be determined outside the model.[15]

C.2-1. Monetary Base

$$H = IR + DC \qquad (IV\text{-}5.6)$$

Identity IV-5.6 expresses the monetary base (the assets of the monetary authority) as the sum of the stock of international reserves held by the monetary authority and the banking system(IR) and the domestic asset (net of liabilities) holdings of the monetary authority(DC).

Domestic assets of the monetary authority comprise a wide range of assets. The following identity lists the primary types of domestic financial holdings of the monetary authority.

$$DC = CG + CC + OA \qquad (IV\text{-}5.7)$$

where CG is the central bank's net claim on the government, CC the central bank's net claim on the commercial banks and the public, and OA other items (net) in the consolidated balance sheet.

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[15] It would be desirable to study the portfolio preference of the public for the various assets in Tanzania. However, there are several factors, such as limited number of obervations, and absence of any comprehensive model of the Tanzanian banking system which mitigate against undertaking such a study.

C.2-3 Central Bank Reaction Function

$$\begin{aligned}\log(DC) = {} & h_0 + h_1\log(Y) + h_2[\log(Y) - \log(Y)^*] \\ & + h_3[\log(IR) - \log(IR)^*] + h_4\log(TFR) \\ & + h_5 DUM1 \\ & h_1,\ h_2 < 0;\ h_3,\ h_4 > 0 \qquad \text{(IV-7)}\end{aligned}$$

An essential element in the analysis of the relationship between the government's fiscal operations and the money supply is the central bank's reaction function. Theoretically, a central bank reaction function is obtained by solving an optimization problem in which "the monetary authority is viewed as though it minimizes a static quadratic function subject to its perception of the structure of the economy,"(McMillin and Beard, 1980, p. 129.)

The loss function frequently contains as arguments the weighted squared deviation of actual from desired values for the rate of inflation, the level of foreign reserves, the rate of unemployment, the growth rate of GNP or industrial output, and the short term interest rate. The first four arguments are measures of macroeconomic stabilization objectives -- namely, the maintenance of price stability and external equilibrium and the achievement of full employment and rapid economic growth. The last argument is often employed as a proxy for another objective of the monetary authority, namely, the achievement of financial stability.

Solution of the central bank's optimization problem yields a specification of the central bank's reaction function which relates the domestic monetary base or its equivalent as a dependent variable to all the exogenous variables of the macroeconomic model and the desired values of the arguments in the loss function.

There is no general agreement in the literature concerning the choice of policy instruments and target variables. However, for a small open economy, Miller and Askin(1976), Genberg(1976), and Tullio(1981) suggest that domestic credit is generally preferred as a dependent variable to other variables such as interest rates, the money supply, the total monetary base and unborrowed reserves. The choice of the domestic monetary base as the dependent variable is consistent with the monetary approach. For an open economy under a fixed exchange rate regime, the money supply and interest rates are outside the control of the monetary authority and the domestic monetary base is the true policy variable of the system. In the context of developing economies, the available evidence also suggests that domestic credit is a more appropriate monetary policy indicator than other monetary variables (Prozecanski, 1979).

Among the target variables, income, the rate of inflation, the rate of economic growth, and level of international reserves are the most widely used variables. These variables represent the four general objectives mentioned above. However, these objectives, as Prozecanski noted, are not universal for all central banks in LDCs. Porzecanski makes a distinction between two fundamentally different patterns of central banks' behavior. One pattern, referred to as pattern A, is identified with those monetary authorities whose principal objective is the maintenance of price and currency stability; the other, pattern B, is one in which the monetary authority pursues objectives such as financing government deficits and fighting unemployment, and involves, as consequence, a certain rate of inflation and a given pace of devaluation.

The expected relationship between the monetary policy (domestic credit) and the domestic and foreign target variables depends on relative weights attached to each objective in the loss function. For example, when the main objective is to passively accommodate the treasury financing requirements, one can expect a positive relationship between the rate of inflation and the rate of growth of domestic monetary base.

Prozecanki(1979) tests a central bank reaction function in which domestic credit is expressed as a function of foreign reserves, the rate of growth of GNP, and the rate of unemployment, for four countries in Latin America, namely, Argentina, Chile, El Salvador, Mexico, and Venezuela. Some monetary authorities appeared to pursue monetary pattern B (Argentina and Chile) and some A (El Salvador,Mexico, and Venezuela). In the former two countries, the rate of growth of output and price enter with positive coefficients, thus suggesting

> the pursuit of one or two objectives [is] consistent

> with a pattern B: supplementing of government revenues through monetary expansion and/or maintenance of a certain level of real liquidity in the economy even when it means validating, all or in part, past inflationary pressures (Prozecanki, 1979, p. 435.)

In a study on the Italian balance of payments, Tullio(1981) tests a slightly modified version of the standard reserves-flow equation in conjunction with a central bank reaction function which includes treasury financing requirements, defined as government expenditures minus government revenues, in the central bank reaction function. This is based on the hypothesis that government deficits are largely financed through borrowing from the central bank. The results confirm that "the direction of causation runs from the treasury financing requirement to the domestic assets of the central bank to the balance of payments,"(Tullio, 1981, p. 37.) The same results are reported for Mexico by Wilford(1977) and for the United Kingdom by Akhtar, Putnam, and Wilford(1979).

In the context of developing economies, there are also several structural and institutional factors which tend to make a strong case in favor of a more interdependent relationship between fiscal and monetary polices than in developed economies. In the absence of a governement securities market and an income-elastic and well-administered tax system the Finance Ministry's borrowing from the central bank so dominates that, as Coats and Khatkhate observe, "the concept of the monetary authority is usefully broadened to include its deficit financing decision," (p. 17.)

In the case of Tanzania, changes in the central bank's claims on the government were a major source of changes in the monetary base for the entire period under study. The central bank's claims on government rose fom 10 percent of the total monetary base in December 1969 to 76 percent in 1981 (See table III-10).

These points suggest that any specification of the monetary authority must explicitly take into account linkages between government net fiscal operations and the domestic monetary base. This interrelationship between the fiscal variables and domestic credit is examined in this study by specifying a central bank reaction function in which the monetary policy indicator (domestic credit) as a dependent variable is related to statistical indicators of achievement of objectives (including both internal and external objectives) as independent variables. Internal obectives include treasury financing requirements, economic growth and economic stabilization, and price stability. External objective involves achieving an appropriate growh of foreign exchange reserves. The latter objective has clearly been expressed by Baffi(1970),

> economic development requires that the central bank should create the amount of liquidity which is

> necessary to sustain it. Convertibilty and the growth of foreign trade connected with economic development require that foreign assets be increased along with domestic assets. In order to satisfy the two requirements part of the additional liquidity will have to be generated through the foreign components of the base..., according to an upward trend at which monetary policy will aim(p. 12.)[16]

Following Miller and Askin(1976) the economic growth and stabilization objectives are here measured respectively by the level of real income and the level of excess demand, the latter defined as the difference between real income and full capacity output. The foreign exchange reserves objective is represented by the difference between actual and desired international reserves.[17] The central bank reaction function, then, can be written as

$$\begin{aligned} \log(DC) = h_0 &+ h_1\log(Y) + h_2[\log(Y) - \log(Y)^*] \\ &+ h_3\log[(IR) - \log(IR)^*] + h_4\log(TFR) \\ &+ h_5 DUM1 \qquad (IV\text{-}7) \end{aligned}$$

where TFR denotes the treasury financing requirements (defined as the total government expenditures minus the government domestic revenues), Y and Y^* are actual and full capacity output, and IR and IR^* are actual and desired international reserves respectively. The central bank reaction function also includes a dummy variable (DUM1) which takes value one for the years 1962-1963 and zero in other years. DUM1 is included in equation IV-6 to test for structural changes (if any) resulting from the replacement of the East African Currency Board by the Bank of Tanzania.

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[16] The above quotation is taken from Tullio(1981, pp. 58-59).

[17] For the measurement of desired international reserves see chapter V, section E.

The coefficient h_1 measures the extent to which the monetary authority provides liquidity in the face of economic growth and the coefficient, $h_2 - h_1$, the cyclical character of the monetary policy. An increase in real income, ceteris paribus, has two contradictory implications for the monetary authorities, as the demand for both money and imports will grow with an increase in the real income. The first effect calls for restrictive monetary policy while the second effect calls for an expansion in the domestic credit.

D. Fiscal Sector

$$\begin{aligned} \log(TFR) = {} & \lambda_3 t_0 + \lambda_3 t_1 \Delta\log(P) + \lambda_3 t_2 \log(IDE) \\ & + \lambda_3 t_3[\log(Y) - \log(Y)^*] + (1 - \lambda_3)\log(TFR)_{-1} \\ & + \lambda_3 t_4 DUM2 + \lambda_3 t_5 DUM3 \\ & t_1,\ t_2,\ t_4 > 0;\ t_3 < 0;\ \lambda_3 > 0 \qquad \text{(IV-8)} \end{aligned}$$

Government bugetary positions play not only a crucial role in the process of money supply creation but also in the determination of the level of economic activity. This is especially so in Tanzania where the government is directly involved in undertaking various economic activities and enjoys a monopoly power over the financial sector of the economy. Furthermore, in the context of developing economies, fiscal instruments in general and fiscal financing in particular play a distinctive role different from their common role demand management in developed economies. In the former, deficit financing is generally considered as "an instrument by which potential saving can be pre-empted for the public sector, or the rate of investment raised above the level of voluntary saving,"(Chelliah, 1976, p. 741.)

D.1. Government Expenditures

Because of low capita income, low private investment, and inadequate social sevices, governments in many LDCs tend to finance many development projects in order to meet a certain growth target and a targeted distribution of income. Many government expenditures are, then, either previously committed or related to politically sensitive issues such as subsidies, public sector employment and social services. This suggests that government expenditures or at least a large part of them are limited in their scope for discretionary actions. In developing nations, the tax structure is also different from the tax system in developed coutries.

D.2. Government Domestic Revenues

In contrast to developed economies, personal and corporate taxes are of less importance in many developing countries. Instead, dependence is greater on sales taxaton and taxes on international transactions. The latter are much more significant because foreign trade often constitutes a relatively large proportion of the output of the monetized sector of the economy and they are also easy to administer and difficult to evade. The tax base of these economies, then, becomes more susceptible to large fluctuations in the balance of payments than in developed economies . This is especially so in Tanzania and other developing economies which export mainly a few primary products and import a relatively large proportion of their industrial intermediates and capital goods. The greater dependence on international transactions, as Behrman notes, "adds more to the difficulties of stabilizing these economies because balance of payments considerations may conflict with the use of taxes for stabilization purposes," (Behrman, 1977, p. 481.)

D.3. Formulation of Fiscal Variables

In most macroeconometric models government expenditures and revenues are assumed to be exogenously determined. However, recently there have been a number of attempts to explain government expenditures and revenues (Aghevli and Khan, 1977 and 1978; Tanzi, 1978; and Heller, 1980). These formulations of fiscal variables are mainly confined to the evaluation of net government fiscal response to inflation. According to one formulation, for any level of real income, "the government attempts to keep its real expenditures constant in the face of an increase in the price level" (Aghevli and Khan, 1978, p. 389.) At the same time, due to collection lags and low income tax elasticities, nominal revenues lag substantially behind the price increase. An increase in the level of prices, according to this hypothesis, will then result in an increase in government deficits which in turn increase the stock of money as the government relies heavily on the central bank to finance its deficits. The financing of this inflation-induced deficit would then increase the nominal stock of money and generate further inflation. This hypothesis has been tested for several developing countries. It is found that "fiscal policy tends to be automatically destabilizing; the principal built-in destabilizing being the revenues lags.... A passive fiscal policy in times of inflation is, therefore hazardous," (Aghevli and Khan, 1978, p. 411.)

However, inflation is only one of the factors affecting the government deficit. More recently, Tanzi(1982) identifies, in addition to inflation, four other major causes underlying fiscal imbalances, defined as the difference between government expenditures and revenues. These causes can be summarized as follows.

1. *Export Boom*

For many developing economies, foreign exchange earnings and government revenues depend heavily upon the export of a few primary products whose prices and quantities vary sharply with world prices and climatic conditions. A sharp increase in the price of exports tends to increase substantially the country's foreign earnings and government revenues. Under such circumstances,

> the government finds itself in the same situation as the winner of a lottery prize. Should it continue to spend in relation to its 'permanent' income; or, should it raise the level of its expenditures to the level of revenue? (Tanzi, 1982, p. 1072.)

There are many examples of countries that, faced with a commodity boom, have sharply increased their current expenditures as if the commodity boom were permanent. With the end of the boom, government revenue falls while the government finds it difficult to cut expenditures.

2. *Public Enterprise Performance*

There are basically three channels through which the performance of public enterprises could affect fiscal balances.

a) Prices charged by public enterprises for their goods and services often do not reflect production costs as the government attempts either to slow down the rate of inflation by constraining prices charged by public enterprises or to subsidize the users.

b) In many LDCs, governments often attempt to promote employment polices by expanding the size of government and public enterprise employment beyond efficient levels.

c) Over-ambitious investment programs by some public enterprises, coupled with a government inability or unwillingness to control these enterprises, are cited as main contributing factors to fiscal imbalances in many developing countries. These projects are often accompanied by additional domestic and foreign borrowings. Eventually, "the government is compelled to increase its budgetary transfers to the public enterprises, thus internalizing their deficits," (Tanzi, 1982, p. 1074.)

3. *Increased Expenditures Produced by Political Exigencies or Administrative Weakness*

Fiscal imbalances could be the result of an increase in government expenditures caused by factors which are neither structural nor external as they were under the above two cases. For example, a government might pursue certain objectives such as new employment, welfare programs, and income redistribution through subsidies that can not be met at present levels of revenue.

4. *Deterioration in the Terms of Trade*

A drastic fall in export prices or an increase in the price of an imported commodity such as oil could also adversely affect government expenditures and revenues. A rise in import prices tends to affect government expenditures both directly and indirectly as, the government attempts to neutralize the price increase for domestic consumers by reducing taxes on production or subsidizing the main domestic users.

In a study on the causes of fiscal imbalances in 23 developing countries for the period 1974-1980, Tanzi concludes that the growth of public expenditures and particularly the growth of current public expenditure has been the most common cause underlying fiscal imbalances in these countries. In the case of Tanzania, he relates the growing fiscal imbalances to the growth in public expenditures and fall in revenues resulting mainly from import restrictions and administrative difficultes. The growth in expenditures is found to be the result of government subsidization schemes.

It is beyond the scope of this study to incorporate fully all factors underlying fiscal imbalances, considering the highly aggregated nature of this study and more importantly the absence of data covering the period under study. However, the equation for treasury financing requirements is formulated so as to capture either directly or indirectly the main factors underlying fiscal imbalances in Tanzania.

To measure quantitatively the impact of factors underlying fiscal imbalances, the actual treasury financing requirement is here assumed to adjust to the difference between the desired and actual treasury financing requirement according to the following adjustment mechanism

$$\Delta \log(TFR) = \lambda_3[\log(TFR)^* - \log(TFR)_{-1}] \qquad (IV\text{-}8.1)$$

where λ_3 measures the speed of adjustment. The desired treasury financing requirement(TFR^*) is here hypothesized to vary with changes in prices($\Delta\log(P)$), 'implicit deficitsantics'(IDE, or anticipated (planned) government deficit expenditure as defined below), deflationary/inflationary gap($Y - Y^*$), and two dummy variables.

$$\log(TFR) = t_0 + t_1\lambda_3\Delta\log(P) + t_2\log(IDE) + t_3[\log(Y) - \log(Y)^*] + t_4DUM2 + t_5DUM3 \qquad (IV\text{-}8.2)$$

Substituting IV-8.1 into IV-8.2 yields

$$\log(TFR) = \lambda_3t_0 + \lambda_3t_1\Delta\log(P) + \lambda_3t_2\log(IDE) + \lambda_3t_3[\log(Y) - \log(Y^*)] + (1 - \lambda_3)\log(TFR)_{-1} + \lambda_3\ t_4DUM2 + \lambda_3\ t_5DUM3$$

$$t_1,\ t_2,\ t_3,\ t_4>0;\ \lambda_3>0 \qquad (IV\text{-}8)$$

Following Dutton (1971) and Aghevli and Khan(1977 and 1978), an increase in prices is hypothesized to increase treasury financing requirements as government expenditures adjust faster to price rises than government revenues. Treasury financing requirements are also hypothesized to vary with the discretionary stance of fiscal policy and thus with the gap between actual and full capacity-output.

The task of defining accurately the discretionary stance of fiscal policy at a particular time involves the construction of a summary fiscal impact measure which separates the discretionary part of the total fiscal deficit from its non-discretionary part. In contrast to the variety of such impact measures (for example, full-employment balance and the cyclically neutral budget) devised for the developed economies, little work has been done on this topic in the context of developing economies. More recently Mansfield(1980) has developed a fiscal impact measure for a developing export economy. Following Mansfield the government's fiscal stance is here defined as the difference between actual and 'implicit' government deficits. The implicit deficit is defined as

$$IDE = TDR - TGE$$

where IDE denotes the implicit deficit, TDR is the time trend of government revenue, and TGE is 'allowable expenditure'. The allowable expendiure is calculated by taking the ratio of actual expenditure to trend revenue in a base year and applying the ratio to trend revenue in each year.

Two dummy variables are also included in the treasury financing requirements to measure the impact of the drought of 1974-75 and the Uganda war of 1979-80 on these requirements.

E. Private Expenditures

$$\log(PE) = \lambda_4(e_0 - e_2.a_0) + \lambda_4(e_1 - e_2.a_1)\log(Y)$$
$$- \lambda_4 e_2 a_2 \Pi + \lambda_4 e_2 \log(MS/P)_{-1}$$
$$- (1 - \lambda_4)\log(PE)_{-1}$$
$$e_1,\ e_2,\ a_1>0;\ a_2<0;\ \lambda_4>0 \qquad \text{(IV-9)}$$

In a standard Keynesian macroeconomic model an expenditure equation is frequently specified as a function of the real rate of interest, real income, and wealth. An increase in the nominal stock of money, *ceteris paribus*, is expected to depress the real rate of interest and thereby to stimulate private expenditures (including investment). According to this formulation, as Rhomberg(1965) notes, "the public first bids up security prices but not the prices of other assets and it is only the concomitant reduction in the cost of borrowing which leads to an increase in private expenditures" (Rhomberg, 1965, p. 175.) However, such reasoning, as Rhomberg pointed out, tends to ignore the change in demand for other assets as expenditures on securities rise. Since some of the other assets such as capital goods and stocks of consumer goods have positive supply elasticities, more of additional expenditures may be devoted to the latter than to securities, which are price inelastic in supply. This implies that a decline in the interest rate resulting from an increment in money supply is accompanied by increased spending on other assets. According to this interpretation the significance of the interest rate in the Keynesian expenditures function, as Rhomberg notes, "is not so much that it reflects changes in the cost of borrowing, but that it is an index of changes in expenditures on all types of assets, including securities and investment goods" (Rhomberg, 1965, p. 176.) Thus, as Rhomberg concludes, "rather than include in the expenditure function an interest rate variable which reflects the extent to which an increment of money was not spent on real assets (but instead on securities or not at all), it may be more straightforward to include instead the increment of money itself," (p. 176.)

Recently, Dornbusch(1973) and Agevli and Khan(1980) extended Rumberg's formulation of the expenditure function. According to this new formulation, aggregate real expenditure is equal to real income plus a constant fraction of the public's excess liquidity. More specifically, real expenditures are assumed to adjust to the difference between desired and actual expenditures according to the following adjustment mechanism

$$\Delta\log(PE) = \lambda_4[\log(PE)^* - \log(PE)_{-1}] \qquad (IV\text{-}9.1)$$

where PE^* denotes desired real expenditures, PE actual real expenditures, and λ_4 the coefficient of adjustment. Desired real expenditure is specified as a positive function of real income and of the excess of supply over demand for the stock of real cash balances

$$\log(PE)^* = e_0 + e_1\log(Y) + e_2[\log(MS/P)_{-1} - \log(M^*/P)] \qquad (IV\text{-}9.2)$$

where M^*/P and MS/P are the desired and actual real money balances respectively. The coefficient e_1 represents the real income elasticity of expenditure and it is assumed to be equal to unity in the long-run. That is, real expenditures are equal to real income if the public is satisfied to hold the existing real money cash balances; any excess of planned expenditures over real income is proportionate to the excess supply of money.

It should be mentioned that the ajustment mechanism underlying expenditure equation IV-9.2 is consistent with the monetary approach to the balance of payments. That is, the balance of payments, defined as the difference between expenditures and income, reflects a stock adjustment process rather than a repetitive equilibrium flow as is the case under income/absorption approaches to the balance of payments.

Substituting equations IV-5a and IV-9.2 into equation IV-9.1 gives the expenditure equation IV-9

$$\begin{aligned}\log(PE) = {} & \lambda_4(e_0 - e_2 a_0) + \lambda_4(e_1 - e_2 a_1)\log(Y) \\ & - \lambda_4 e_2 a_2 \Pi + \lambda_4 e_2 \log(MS/P)_{-1} \\ & - (1 - \lambda_4)\log(PE)_{-1} \\ & e_1,\ e_2,\ a_1 > 0;\ a_2 < 0;\ \lambda_4 > 0 \qquad \text{(IV-9)}\end{aligned}$$

where actual real private expenditures(PE) are specified as a function of current real income(Y), the expected rate of inflation(Π), the previous period stock of real cash balances($(MS/P)_{-1}$) and real expenditures in the previous period. The coefficient on real income, $\lambda_4(e_1 - e_2 a_1)$, shows that an increase in real income influences real expenditures in two opposite directions. An increase in real income raises the demand for real cash balances via money-demand equation IV-5a which in turn reduces real expenditures as the public attempts to build up its desired liquidity level. On the other hand, a rise in real income directly increases expenditures via the expenditure equation IV-9. However, the net response is expected to be positive since the expected theoretical values of the real income elasticities of the demand for money, a_1, and expenditures, e_1, are both close to unity; and, e_2, is less than unith, that is, it takes usually more than one period for actual real cash balances to adjust to their desired levels.

F. Inflation

$$\begin{aligned}\Delta\log(P) = {} & p_0 + p_1\Delta\log(MS) + p_2\Delta\log(MS)_{-1} + p_3\Delta\log(Y) \\ & + p_4\Delta\log(ZP.R) + p_5\Delta\log(W) + p_6\Delta\log(ITX) \\ & + p_7\Delta\log(TS)_{-1} + p_8 DUM2 + p_9 DUM3\end{aligned}$$

$$p_1,\ p_2,\ p_4,\ p_5,\ p_6,\ p_8,\ p_9 > 0;\ p_7 < 0;\ p_3 \gtrless 0 \qquad \text{(IV-10)}$$

For a small open economy under a fixed exchange rate regime, the monetary approach to the balance of payments assumes that the price level is exogenously determined by the world price level and it moves rigidly in step with changes in world prices. This is based on the assumption that goods markets are perfectly arbitraged and there are no serious barriers to the international movement of goods. In such a situation, prices and/or money stock would adjust so that domestic demand for real monetary balances equals the supply of real monetary balances.

However, the price level might, especially in the short-run, deviate from its world level and its speed of adjustment to monetary disturbances lower if one or more of above assumptions are not met. This is more true for a developing country such as Tanzania where foreign trade is subject to various barriers, the non-traded goods sector is quite large, and market distortions are norms rather than exceptions. Under such an environment, the economy may experience a higher rate of inflation than the world inflation rate in the short-run even though the long-run convergence of inflation will not be prevented.

To take account of the short-run divergence in the rate of inflation, the rate is made an endogenous variable and its behavior is described by the following equation:

$$\begin{aligned}\Delta\log(P) = {} & p_0 + p_1\Delta\log(MS) + p_2\Delta\log(MS)_{-1} + p_3\Delta\log(Y) \\ & + p_4\Delta\log(ZP.R) + p_5\Delta\log(W) + p_6\Delta\log(ITX) \\ & + p_7\Delta\log(TS)_{-1} + p_8 DUM2 + p_9 DUM3\end{aligned}$$

$$p_1,\ p_2,\ p_4,\ p_5,\ p_6,\ p_8,\ p_9 > 0;\ p_7 < 0;\ p_3 \gtrless 0 \qquad \text{(IV-10)}$$

In equation IV-10 the rate of change of the consumer price index is hypothesized to vary with the level and the rate of change excess demand pressures in product market, which in turn depend upon both domestic and foreign conditions of supply and demand.

Demand Factors

The rate of change of prices is hypothesized to vary positively with the rate of change in the nominal money supply (both current and lagged one period) and negatively (or positively) with the rate of change in real income. For a given demand for real cash balances, an increase in the rate of change of the money supply leads to more excess liquidity and thereby to a faster increase in expenditures and a higher rate of inflation. An increase in real income, *ceteris paribus*, has two opposing effects on inflation. It increases the demand for real cash balances and also increases real private expenditures. Given the supply of cash balances, the increase in demand for real balances can only be met by a reduction in real expenditures. The net effect of a rise in real income on the inflation rate, then, depends on the relative strength of these contradictory real income and monetary effects on real private expenditures.

Supply Factors

The rate of inflation is also hypothesized to vary with a vector of supply shift factors. The supply shift factors include the rates of change in (a)import prices(ZP.R); (b)wage rates(W), and (c)indirect taxes(ITX).

Further consideration of source of inflation is provided by the disequilibrium pressures between demand and supply. Representation of the latter factor is quite difficult because of data limitations. Demand pressure relative to supply has often been proxied by variables such as rate of capacity utilization, inventory level relative to GDP, total demand relative to capacity, and total supply of agricultural output (excluding export crops) and merchandise imports in the price-change determination function (Griffiths, 1972; Behrman, 1977; Khan and Aghevli, 1980). In attempts to represent the disequilibrium pressures between supply and demand we include only the latter proxy (rates of change in total supply of goods available to the domestic economy, $\Delta\log(TS)$, for which there is consistent time series data available.

Finally, two dummy variables are included in the inflation equation IV-10 to capture effects (if any) of the drought of 1974-75 and Uganda war of 1979-80 on the rate of inflation.

G. Other Equations

$$Y = AE + PX + NPX - Z \qquad \text{(IV-11)}$$

$$AE = PE + GE \qquad \text{(IV-12)}$$

$$GE.P = TFR + DR \qquad \text{(IV-13)}$$

$$GE = GE.P/P \qquad \text{(IV-14)}$$

The level of real income (Y) is assumed to be determined by aggregate demand:

$$Y = AE + PX + NPX - Z \qquad \text{(IV-11)}$$

where real income (Y) is equal to real aggregate expenditures (AE) plus real primary exports (PX) and non-primary exports (NPX) less real imports (Z). Real aggregate expenditures, in turn, include real private expenditures (PE) and real government expenditures (GE):

$$AE = PE + GE \qquad \text{(IV-12)}$$

Nominal government expenditure is defined as the sum of treasury financing requirements (TFR) and government domestic revenues (DR):

$$GE.P = TFR + DR \qquad \text{(IV-13)}$$

Equation IV-13 is an identity and thus it does not matter which side is 'explained' within the model. It appeared to be convenient to explain TFR rather than GE or DR. TFR appears as an explanatory variable in central bank reaction function IV-7. Furthermore, such formulation of fiscal operation, as will be discussed in this chapter, appears to be more appropriate for Tanzania than an alternative formulation in which both GE and DR are completely endogenized (see section E).

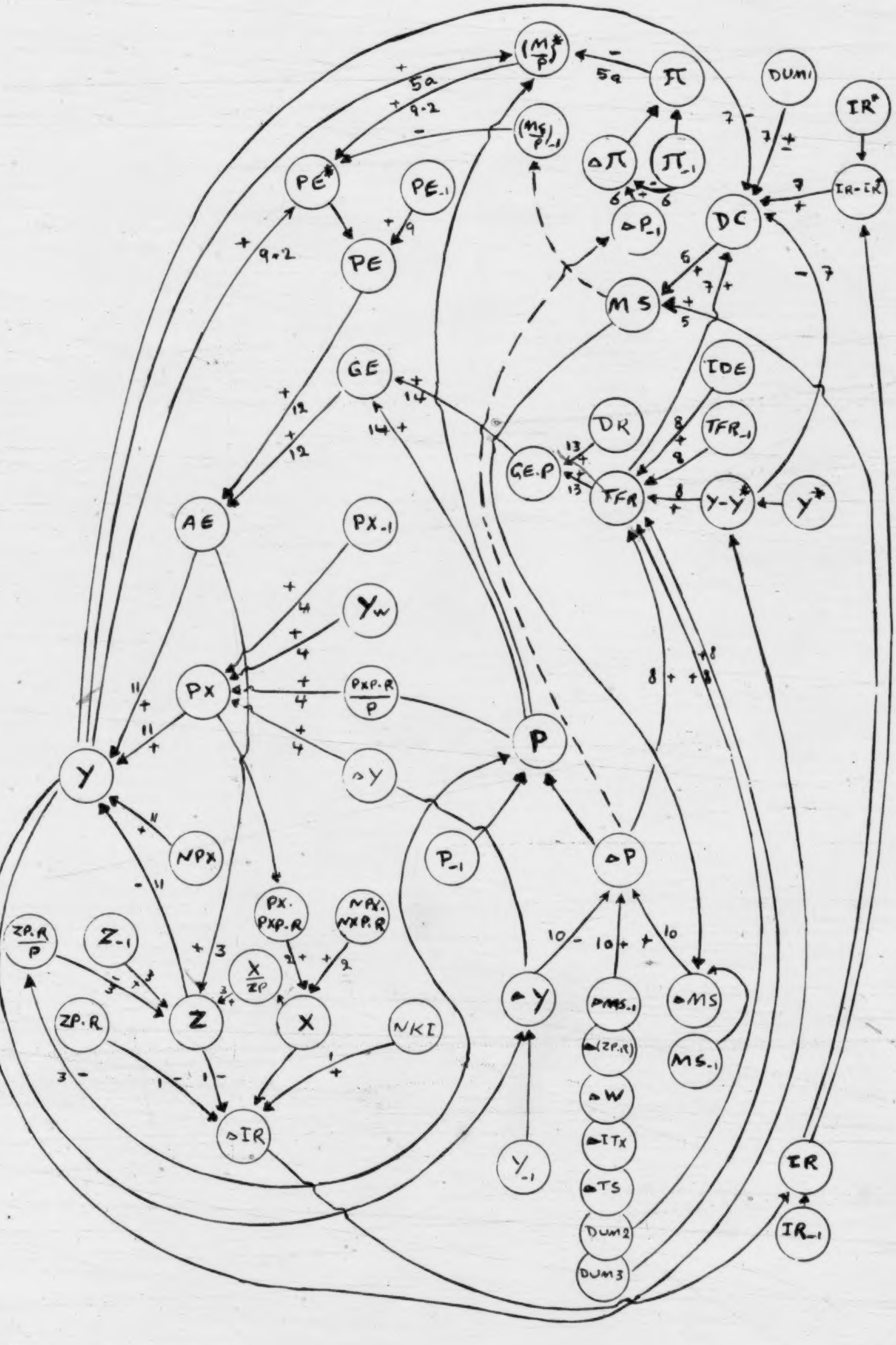
Finaly, real government expenditure is determined by the level of government nominal expenditure and of prices:

$$GE = GE.P/P \qquad \text{(IV-14)}$$

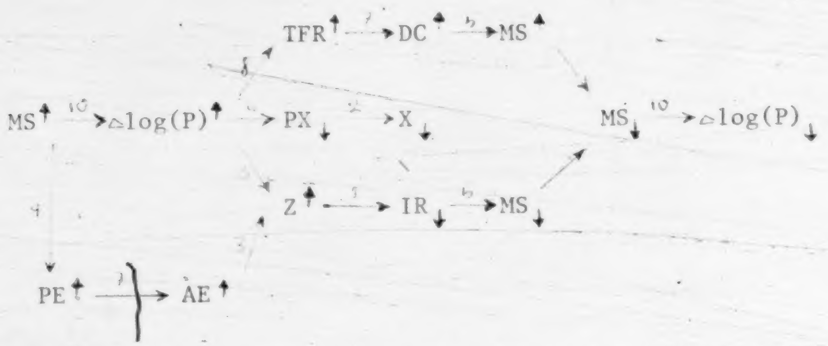
H. Working of the Model

The following flow chart summarizes the causal sequences of the model of table IV-1. The causal sequences of the model are shown by arrows. The equation number and the sign of the partial derivative is shown beside each equation. For expository purposes, consider the effect of a once-and-for-all increase in the planned fiscal deficit or

FigureIV-1. Flow Chart of the Model.


$(\frac{M}{P})^*$
π
DUM1
IR^*
$(\frac{MS}{P})_{-1}$
$\Delta\pi$
π_{-1}
$IR-IR^*$
PE^*
PE_{-1}
ΔP_{-1}
DC
PE
MS
GE
IDE
DR
TFR_{-1}
GE.P
TFR
$Y-Y^*$
Y^*
AE
PX_{-1}
Y_w
PX
$\frac{PXP.R}{P}$
P
Y
ΔY
NPX
P_{-1}
ΔP
PX. PXP.R
NPX. NXP.R
$\frac{ZP.R}{P}$
Z_{-1}
$\frac{X}{ZP}$
ZP.R
Z
X
NKI
ΔY
ΔMS_{-1}
ΔMS
$\Delta (ZP.R)$
MS_{-1}
ΔW
ΔIR
ΔITX
Y_{-1}
ΔTS
IR
DUM2
DUM3
IR_{-1}
5a
9.2
6
7
5
8
12
13
14
4
11
3
10
1
2
9

implicit deficit(IDE). This will directly increase the treasury financing requirements (via treasury financing equation VIII), domestic credit (via central bank reaction function VI), and money supply(via money supply funtion V). An increase in money supply will reach all endogenous variables in varying degree. Since the coefficient of various endogenous variables are not known, it is difficult to predict the direction of change. The following summary flow chart traces secondary effects of an increase in money supply while making some assumptions regarding relative size of the coefficient of endogenous variables.



An increase in money supply will lead to an increase in prices (via inflation equation X) and in private expenditures (via private expenditures equation IX). Both increase in prices and expenditures will increase imports (via imports equation III). Real income will fall or rise depending on whether net real imports increase by more or less than aggregate expenditures (equation XI). If imports increase by less than the increase in expenditures, real income will rise and this in turn will cause prices to rise farther (via the inflation equation X). An increase in prices will have three simultaneous effects:

i) it increases imports(via imports equation III);

ii) it reduces primary exports (via primary exports equation IV);

iii) it increases fiscal imbalances and thereby domestic credit as Treasury financing requirements are monetized by the central bank(equation VIII). As a result balance of payments will worsen and foreign reserves will run down. The money supply will fall provided that the monetization of fiscal deficits does not offset the contractionary effect of reduced foreign reserves on the money supply.

Therefore, a once-and-for-all increase in government planned deficit would have the short-run effect of raising the money supply and the rate of inflation, but this process would be reversed with the feed-back on the money supply through the balance of payments. In such a case, an increase in prices will be a short-run phenomenon and the chain of causation will continue until a steady state is restored.

V. THE MONETARY APPROACH TO THE BALANCE OF PAYMENTS: THE EMPIRICAL RESULTS

This chapter reports the econometric procedures and the empirical results of estimating the model outlined in the previous chapter. The chapter is divided into three main sections. The first section outlines sources of the data used in this study, their reliability, and shortcomings. The second section presents and discusses the econometric results for each of the individual equations of the model. Lastly, section three summarizes the main findings of this study.

A. The Data and Econometric Technique

A.1. *Sources of Data*

The data used in this study cover the period 1962-1981 and are confined to Mainland Tanzania. The data were obtained from various sources: Real variables such as gross national product, aggregate domestic expenditures, imports and exports, and the government expenditures and revenues were obtained from *The Annual Economic Survey, National Account of Tanzania, Background to the Annual Budgets*(see bibliography). The data on money supply, domestic credit, net international reserves, and other financial variables were obtained from the Bank of Tanzania's publications (*Economic Bulletin*, and *Economic Report and Operations*), *the International Financial statistics, Balance of Payments Statistics*, and *Government Finance Statistics Yearbook.*

However, the latter sources cover only the period 1966-1981. Prior to 1966, Tanzania was part of the East Africa Currency Board and no monetary survey data are available for each member country. For this period, 1962-1965, we used the estimates of the financial statistics given in the Economic Survey of Africa(1967).

In constructing the series for the money supply, domestic credit and the net international reserves, the published data were all adjusted for seasonality in the economy. For an agrarian economy, such as Tanzania where the crop season generally takes place in the last four months of the year, the end of the year figures for stock varibales (such as money supply) are generally inflated relative to those in the first two thirds of the year. To adjust for seasonality, quarterly averages were calcuated for the period 1966-1981 from the data given in the Bank of Tanzania's pulications. For the period 1962-1965 the available annual estimates were adjusted downward by using the average rate of overestimation of annual data for the period 1966-1981.

All the nominal variables are measured in millions of Tanzanian Shilling and real variables are measured at 1966 prices. The consumer price index deflator was obtained from the *Annual Economic Survey*, and the import and export price deflators were obtained from the *World Tables* for the period 1962-1977. For the period 1977-1981, the import price index for the Developing African Countries, as given in the

International Financial Statistics was used to deflate nominal imports. The export price deflator was constructed by the author for the Tanzania's six major export crops(see section C).

The series for the expected rate of inflation(Π) were generated using values of Θ ranging from 0.05 to 1.00 in equation V-5. The upper bond (Θ=1.00) reduces the average or mean-time lag to one year. Since we are using annual data, a one-year mean-time lag is consistent with instantaneous adjustment as implied by the demand for money equation. Each of the these series of expected inflation(Π) was substituted into the real expenditure equation alternatively and an appropriate Θ was chosen on the basis of the smallest standard error for the equation.

A.2. Shortcomings of the Data

In Tanzania, like many other LDC's, the data on macroeconomic variables are generally less reliable than those in developed countries. For example, a relatively large part of economic activity is carried out in the subsistance sector of the economy which is either not recorded in the national accounts, or if recorded consists of no more than rough estimates based on the agricultural officer's field observation. However, the reliability of the data used in this study seems to be less serious than it appears considering the high level of aggregation of our model and the predominance of relatively more reliable data, such as imports, exports, international reserves, money supply, domestic credit, and the government expenditures and revenues.

Another main shortcoming of the data is consistency. The Bank of Tanzania provides the most consistent data on the money supply and domestic credit for the period 1966-1981, while for the period 1962-1965 the data are rough estimates and they are not generally consistent with the former series. The data on GNP and its components as given in *National Account of Tanzania* and *Annual Economic Survey* cover the period 1964 to 1981. For the period 1960-1963, the data on GNP and its components were obtained from the *Background to the Annual Budget* and *Statistical Abstract* which are not consistent with the latest revised national account data given in the *Annual Economic Survey.*

A.3. Estimation Procedures.

The simultaneous equation system formulated in the previous chapter is non-linear in variables but linear in parameters. In addition, all behavioral equations satisfy the order condition for identification. Under such circumstances, it can be shown that the two-stage least squares method yields consistent, though not necessarily efficient, estimates of the parameters in the model (Amemiya,1974). However, considering the large number of the predetermined variables (including both independent and lagged dependent variables) it was not possible to carry out the first stage of 2SLS as the number of predetermined variables exceeded the number of observations. To overcome this problem the principal components were used in 2SLS, as suggested by Klein(1969). According to this method, the predetermined variables in the equation system of table IV-1 were replaced by the six largest latent roots of X'X, where X was the matrix of all predetermined variables in the model. This enabled us to obtain estimates of the dependent variables and thereby carrying out the second stage of 2SLS.[18] These six principal components accounted for about 97 percent of the variation in the predetermined variables.

B. Structural Equation Estimates

The results of the estimated behavioral equations are summarized in table V-1.

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[18] In estimating a revised version of the Klein-Goldberger model of the U.S. economy, Klein suggests that among the 2SLS and full information maximumm likelihood the 2SLS estimates based on just four principal components were the best of the four.

TableV-1. Econometric Results of the Structural Equations of the Model

Imports

$$\log(Z) = \underset{(-0.85)}{-\ 0.62} \underset{(-2.11)}{-\ 0.44} \log(ZP\ .\ R/P) + \underset{(3.36)}{0.55} \log(AE)$$

$$+ \underset{(2.38)}{0.32} \log(X/ZP)_{-1} + \underset{(1.64)}{0.31} \log(Z)_{-1}$$

$h=0.11$, $\bar{R}^2=0.89$

Primary exports

$$\log(PX) = \underset{(5.70)}{0.96} + \underset{(4.62)}{0.43} \log(PXP\ .\ R/P)_{-1} + \underset{(1.66)}{0.85} \Delta\log(Y)$$

$$+ \underset{(0.04)}{0.001} \log(YW) + \underset{(11.50)}{0.75} \log(PX)_{-1}$$

$h=0.20$, $\bar{R}^2=0.62$

Domestic credit

$$\log(DC) = \underset{(-7.20)}{-23.04} + \underset{(7.55)}{3.14} \log(Y) - \underset{(-4.18)}{4.02}[\log(Y) - \log(Y)^{*}]$$

$$+ \underset{(3.58)}{0.33} \log(TFR) - \underset{(-4.18)}{0.29}\ DUM1$$

$$- \underset{(-0.64)}{0.04}[\log(IR) - \log(IR)^{*}]$$

$D.W.=1.71$, $\bar{R}^2=0.99$

Treasury financing requirements

$$\log(TFR) = \underset{(-{-}2.20)}{-1.73} + \underset{(2.00)}{2.03}\ \Delta \log(P) + \underset{(3.66)}{0.77} \log(IDE)$$

$$+ \underset{(3.72)}{0.45} \log(TFR)_{-1} + \underset{(2.84)}{0.57}\ DUM2$$

$h=0.18$, $\bar{R}^2=0.97$

TableV-1. (cont'd). Econometric Results of the Structural Equations of the Model.

Private expenditures

$$\log(PE) = \underset{(-0.24)}{-0.15} + \underset{(2.67)}{0.91} \log(Y) - \underset{(-2.43)}{0.32}\, \Pi_{-1}$$

$$+ \underset{(1.73)}{0.11} \log(MS/P)_{-1} \qquad D.W.=1.901,\ \bar{R}^2=0.98$$

Inflation

$$\Delta\log(P) = \underset{(1.59)}{0.08} + \underset{(2.19)}{0.33}\, \Delta\log(MS) + \underset{(1.69)}{0.25}\, \Delta\log(MS)_{-1}$$

$$- \underset{(-2.39)}{1.20}\, \Delta\log(Y) - \underset{(-1.73)}{0.26}\, \Delta\log(TS)_{-1}$$

$$+ \underset{(1.64)}{0.16}\, \Delta\log(ZP.R) \qquad D.W.=1.71,\ \bar{R}^2=0.37$$

The ratio of coefficients to standard errors (t-statistics) are given in parenthesis under the coefficients, R^2 is the adjusted coefficient of determination (adjusted for degrees of freedom)[19] , the Durbin-Watson statistic(D.W.), and Durbin's h-statistic[20]

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[19] In a 2SLS estimation process, R^2 should be interpreted with caution. R^2 is a measure of the proportion of the total variance accounted for by the linear influence of the explanatory variables. Since 2SLS uses the fitted value of explanatory (endogenous) variables rather than actually observed values R^2 should be interpreted with this modification in mind.

[20]. In the presence of a lagged dependent variable the D.W. statistic is likely to have reduced power and is biased toward 2 (Nerlove and Wallis, 1966). For these circumstances Durbin h-statistic is often used to test for the first-order autocorrelation. Dubin's h-statistic is calculated as follows,

$$h = (1 - 1/2\ D.W.)[T/1-T\ V(b_1)]^{1/2}$$

where $V(b_1)$ is the OLS estimate of the variance of the lagged dependent variable and T is the sample size.

C. The Import Equation

$$\log(Z) = \underset{(-0.85)}{-\,0.62} \underset{(-2.11)}{-\,0.44} \log(ZP.R/P) + \underset{(3.36)}{0.55} \log(AE)$$

$$+ \underset{(2.38)}{0.32} \log(X/ZP)_{-1} + \underset{(1.64)}{0.31} \log(Z)_{-1} \qquad \text{V-1(a)}$$

$$\log(Z) = -\,0.91 - 0.65 \log(ZP.R/P) + 0.81 \log(AE)$$

$$+ 0.47 \log(X/ZP)_{-1} \quad h=0.11,\ \bar{R}^2=0.89 \qquad \text{V-1(b)}$$

In the basic underlying model current imports (Z) are hypothesized to vary positively with current real aggregate expenditures (AE) and the degree of commercial policy restrictiveness as proxied by nominal exports deflated by the import price index (X/ZP), and negatively with the relative price of imports to the domestic price level (ZP . R/P). Imports are also hypothesized to vary with the real imports lagged one period. Lagged imports may, as pointed out in the previous chapter, have either a positive or negative coefficient. A positive coefficient reflects Houthakkar-Taylor(1970) habit formation, the need for more than one year to adjust actual imports to their desired level. A negative coefficient, on the other hand, indicates a Houthakkar-Taylor inventory effect. According to the latter effect, stocks built up from previous imports diminish the demand for current real imports. As equation V-1(a) shows, the estimated coefficient on the lagged import is positive and significantly different from zero at 10 percent, indicating the dominance of the habit formation or adjustment effect. The estimated coefficient of lagged imports is 0.31 which implies an adjustment coefficient of about 0.68 and a mean-time lag $(1/\lambda_1)$ of about 18 months. This implies that it would take about two years before 90 percent of the gap between the desired level of real imports in the current period and the actual import flow in the previous period could be eliminated. Such a pattern of adjustment lag seems to be quite reasonable for Tanzania, considering the bureauratic system of import licensing and foreign exchange allocation (see chapter III).

Equation IV-1(b) presents the parameter estimates of the long-run import demand function. They were obtained by dividing the estimated short-run import elasticities of equation V-1(a) by the estimated adjustment coefficient. These estimates are long-run in the sense that all adjustments due to the inclusion of lagged imports are assumed to have occurred.

On an overall basis, the specification of the import demand equation seems to be reasonably statisfactory. The estimated coefficients have all their anticipated signs and they are, except for the lagged imports, all statistically significant at the 5 percent level. The hypothesized determinants of the real import flow into Tanzania are consistent with about 90 percent of the variation in the dependent variable. Judging from the Durbin's h-statistic no undue problem of serial correlation seems apparent.

Relative Prices

As the import demand equations V-1(a) and V-1(b) indicate, imports are quite price inelastic both in the short and long run. These results are not surprising for a small developing country such as Tanzania, at least for the following two reasons:

i) During the period under study, imports of consumer items (especially luxury items) were seriously curtailed in favor of intermediate and capital goods for which there were few domestic substitutes. As such one would expect the relative price term to reflect only substitution on the technological side (among labor, capital, and the imported inputs).

ii) Factor markets in Tanzania, like in many other LDC's are generally characterized by various forms of price distortions and an institutional setting which tend to favor the employment of a more capital-intensive and import-intensive technique than is suggested by the country's factor endowments. (see chapter II).

These results compare favorably with the estimated price elasticities reported for other LDC's (Lioi, 1974; Otani, 1975; Otani and Park, 1976; Behrman, 1977; Aghevli and Khan 1981). Lioi, Park and Otani, and Behrman estimated three separate import demand equations for consumption, intermediate, the capital goods . Price elasticities were generally found to be low, ranging between 0.15 and 0.8. Aghevli and Khan estimated an import equation similar to equation V-1, except that they did not include the policy restrictive variable. In estimating the import equation for eight developing countries they found the price elasticities to be as low as 0.74 (Argentina) and as high as 1.9 (Philippines). However, the relatively high price elasticity reported by Aghevli and Khan might partly be due to the type of domestic price index included in the relative price term. The price of imports was deflated by the domestic cost of living index rather than the GDP price deflator. Replacing the GNP price deflator by the consumer price index we reestimated the import equation V-1 and the price elasticity was found to be about 1.09. For the problem at hand the GNP price deflator is more appropriate, considering the fact that the bulk of imports into Tanzania consists of intermediate and capital goods and more importantly the domestic cost of living index is mainly confined to a small number of consumer commodity groups, some of which are heavily subsidized.

The relatively high price elasticity reported by the Aghevli and Khan study might be also due to the fact that the countries under their investigation are among the industrially developed LDC's. The relatively large industrial base in these countries implies a greater degree of substitution between domestically produced industrial inputs and imported ones than is generally possible in Tanzania with its small industrial base.

For a given level of real aggregate expenditures, import policy restrictiveness, and lagged imports, the price elasticities tend to suggest that a devaluation of the Tanzanian Shilling would have little influence on the volume of imports. However, there are three important aspects of the response of imports to the relative price which are worth mentioning.

First, to the extent that the prevailing price distortions in the commodity and factor markets are due to the maintenance of an overvalued exchange rate and of complex quantitative restrictions, one might argue that a devaluation tends to reduce the magnitude of price distortion. The reduction in market distortion, in turn, encourages the employment of a technique of production which is more consistent with the country's factor endowment than the one prevailing before the devaluation. Bhagwati(1978) and Krueger(1978) have well documented the incredible resource misallocation resulting from quantatitve restrictions and foreign exchange controls.

Second, the examination of elasticities focuses on the expenditure and resource reswitching of devaluation with no reference to the direct impact of devaluation on real private expenditures. According to the monetary approach to the balance of payments the devaluation of a currency tends to speed up the process of balance of payments adjustment through monetary factors. An increase in the price of imports resulting from a devaluation raises the overall domestic price index, which in turn reduces real money balances held by the public. Provided that the monetary authorities do not finance fully the rise in prices, aggregate private expenditure, real imports and the net capital outflow are reduced as the public attempts to restore its liquidity balances (see chapter III and the following section on the aggregate private expenditures). There is, in fact a broad support for the view that depreciation in developing countries tend to reduces real expenditures (See Bird(1983) for a review of literature).

In addition to the direct impact of devaluation on aggregate expenditures, it is also argued that devaluation has a deflating redistributive effect on income and thereby on aggregate domestic expenditures (Bird,1983; Knight,1976; Krugman and Taylor, 1978; Bird, 1983).

Finally, a devaluation might also be a significant source of demand deflation as the currency devaluation increases the domestic currency costs of debt-servicing and any other external obligations expressed in the foreign currency. The higher the volume of foreign debt and interest rate, the higher would be the adverse effect of devaluation on the services of the balance of payments and the domestic expenditure-reducing effect (see Bird, 1983).

These potential responses of imports to changes in the relative price of imports, though not directly measured by the highly aggregated import equation V-1, tend to suggest that a currency depreciation acts both as an expenditure and resource reswitching device as well as an expenditure-reducing device.

Other Determinants of Imports

In addition to the relative price term, real imports are also hypothesized to vary with real domestic aggregate expenditures on both domestically produced and imported goods and services, and foreign sector policy restrictiveness. The latter variable is commonly approximated in the literature by any one of the value of foreign exchange reserves deflated by the unit value of imports, import capacity provided by exports (nominal exports deflated by the unit value of imports), and the ratio of black market nominal exchange rate to the national account exchange rate (Turnovsky, 1968; Otani and Park, 1976; Diaz-Alejandro, 1976; and Behrman, 1977). Between the first two proxies for which there are readily available data over the period under the study, the import capacity provided by exports appeared to be statistically significant.

The results indicate significant and substantial responses to foreign sector policy restrictiveness, and to the combined effect of domestic aggregate expenditures and foreign policy restrictiveness. According to the estimated coefficients of these two variable a 10 percent simultaneous increase in real aggregate expenditures and import capacity, other things being equal, tends to raise imports by about 8.7 percent within one year and by as much as 14.6 percent by the end of the eighteen months.

Such a pattern of import response to the combined effect of expenditures and foreign sector restrictiveness implies, among other things, that a liberalization of foreign trade will increase rapidly the flow of imports into Tanzania even though imports appear to be relatively expenditure inelastic. A liberalization of foreign trade,then tends to bring about a rapid depletion of foreign reserves unless the foreign trade liberalization is followed by an export promotion policy or a capital inflow which make it possible to sustain the rapid growth of imports. This might explain Tanzania's bitter experience with its import liberalization of 1978. The liberalization of imports in 1978 reduced foreign reserves from 2518 million Shillings at the end of January 1977 to as low as 224 million Shillings (about 2.4 percent of the import bill for 1979) by the end of the same year (*Economic Bulletin*, December 1981). With the disappearance of coffee boom of 1976-1977, exports followed their secular decline and import liberalization was soon replaced by a more complex quantitative trade and foreign exchange restrictions.

In comparison to other import demand studies in LDC's, the expenditure elasticity of imports appears to be quite low in Tanzania. Aghevli and Khan (1980) estimated an import demand equation similar to equation V-1 for eight developing countries. The estimated expenditure elasticity of import demand was found to be as low as 0.87 for Colombia and as high as 2.50 for Argentina. Otani(1975) in his study of import demand in Philippines found the long-run expenditure elasticity to be about 1.50 The same results are also reported for Korea by Otani and Park(1976) who estimate two separate import demands for consumer and intermediate items.

The relatively small import demand expenditure elasticity in Tanzania might be due to its specific economic features such as a relatively large subsistence sector, the early stage of industrialization, and a complex system of import control measures. The subsistence sector accounted for over one-third of the nominal GDP over the years of 1970's(*Economic Survey*, 1981). There is growing evidence that the import substitution pattern of industrialization tends to reduce a country's reliance on imports in the early stage of industrialization as many imported consumer items are produced domestically (Little, Scitovsky, and Scott,1970).

D. The Export Supply Equation

$$\log(PX) = \underset{(5.70)}{0.96} + \underset{(4.62)}{0.43} \log(PXP\ .\ R/P)_{-1} + \underset{(1.66)}{0.85} \Delta\log(Y)$$

$$+ \underset{(0.04)}{0.001} \log(YW) + \underset{(11.50)}{0.75} \log(PX)_{-1}$$

V-2(a)

$$\log(PX) = 3.56 + 1.59 \log(PXP\ .\ R/P)_{-1} + 3.4\Delta\log(Y)$$

$$+ 0.004 \log(YW)$$

$h=0.20$, $\bar{R}^2=0.62$ V-2(b)

Equations V-2 present the estimates of the primary export supply over the period 1962-1981. The quantity of primary exports supplied (PX) is hypothesized to vary positively with relative export prices (PXP.R/P), the economy's capacity to produce exports (proxied by the rate of change of GDP), the level of world demand (Yw), and primary exports lagged one period. The estimated coefficient of the lagged exports is 0.73 which implies an adjustment coefficient of about 0.25 and a mean-time lag ($1/\lambda_2$) of about 4 years. This means that it would take about four years and as long as 7 years for about 65 percent and 85 percent of the gap between the desired primary exports in the current period and the actual one in the previous period to be eliminated respectively. Considering the dominance of perennial export crops such as tea, coffee, and cashewnuts in the total primary export crops such pattern of adjustment does not seem to be unrealistic.

Equation V-2(b) presents the parameter estimates of the long-run supply function of primary exports, obtained by dividing the short-run parameter estimates of the primary export equation V-1(a) by the estimated adjustment coefficient. These estimates are long-run in the sense that all adjustments due to the inclusion of lagged primary exports are assumed to have occurred.

On an overall basis, results appear to be reasonably satisfactory. All variables have their a priori expected signs and, except for the capacity-to-produce export variable, non-zero coefficients. The h-test indicates an absence of autocorrelation of the residuales. However, the hypothesized determinants of export, explain only 62 percent of the variance in the dependent variable.

The adjusted coefficient of determination may appear to be low in comparison to other equations included in the model, but it should be noted that the variation in the dependent variable (volume of exports) to be explained is quite substantial and erratic. Primary exports, over 80 percent of total exports, have predominately been cultivated on a large number of small family holdings for which factor productivity and volume of production tend to vary greatly with the state of the physical environment (see chapter II).

The Price Characteristics

The relative price term (lagged one year) is represented by the ratio of the external price times the exchange rate to the gross domestic price deflator. The estimate of the price elasticity of supply of export suggests that a significant, though not substantial, aggregate agricultural supply response occurred in Tanzania. The estimated short-run and long-run price elasticities were found to be 0.43 and 1.59 respectively. Three aspects of the price response of aggregated agricultural primary exports are worth mentioning.

First, the significant response of the supply to prices as suggested by equation IV-2(a) tends to contradict the frequently encountered assumption of complete rigidity. The latter assumption, commonly held by Tanzanian government officials and the "structuralist school," maintains that the cost-price relationship in the primary sector of developing economies is not important from the point of view of a country's exports, and consequently, exchange rate policies such as devaluation have a limited role to play(Taylor, 1980).

Second, as Professor Kaldor(1983) noted, it may be true that in the presence of an inelastic supply response to an increase in price, any increase in production presupposes an increase in the area of cultivation or in the replanting of trees, which requires a number of years before it leads to an increase in production. Yet, the same supply response might not hold for a decline in the domestic price of export crops. In the latter case, the real price received by farmers can fall so seriously that it may become more profitable for a farmer to spend less of his or her resources on the cultivation of export crops and devote more to subsistence farming. There is in fact some evidence to suggest that a growing number of farmers in Tanzania have been withdrawing from the production of cash crops in response to the rapid decline in the farmers' terms of trade (Hyden,1980; and The Economist,1983).

Third, the asymmetrical response of exports to prices implies, among the others, that " one must be careful to ascertain that it is the overvalued exchange rate that is responsible for reducing the profitability of the agricultural sector before concluding that devaluation will solve the problem,"(Kaldor, 1983).

These estimates of price elasticities of export do not appear to be inconsistent, at least with the most of price elasticities reported for other LDC's. In estimating the aggregate agricultural export supply for Chile, Behrman (1977) found the price elasticity to be 0.5. The price elasticity was also found to be as low as 0.14 for Sri Lanka (De Silva, 1977), 0.56 for Colombia (Aghevli and Khan 1980), and as high as 2.24 for Ecuador (Aghevli and Khan 1980). With regard to individual export crops the short-run price elasticities are reported to be as low as 0.06 for sisal (Tanzania), and as high as 0.73 for cotton (Uganda) and 0.64 for coffee (Kenya) (See Bird,1983). The long-run price elasticities were found to be as low as 0.48 for sisal (Tanzania), and as high as 1.55 for coffee (Kenya).

Quantitative Supply Considerations

In addition to the price characteristics, the volume of exports is hypothesized to depend upon the productive capacity of the economy to produce exports, as approximated by the rate of change of real GDP. The estimated coefficient for the rate of change in GDP was positive and statistically significant only at 10 percent. The results suggest that the supply of primary exports is inelastic in output. A 10 percent increase in the rate of growth of GDP, *ceteris paribus*, increases the primary exports supplied by 8.5 percent. This finding is in sharp contrast to those reported for other LDC's. Aghevli and Khan(1980) estimated a similar export supply equation to ours for eight developing countries and found a significant and substantial export response to the overall growth of the economy. The real output elasticity of exports was found to be as high as 5.5 for Korea and 1.3 for Brazil and Philipines, and as low as 0.6 for Ecuador and Mexico. In a separate study, Khan(1977) also found a positive and significant relationship between nominal exports and nominal income for nine developing countries in a sample of ten. In examining the behavior of sectoral real exports for the Chilean economy Behrman(1977) estimated an export equation similar to equation V-2. The results showed substantial responses in exports from agriculture, small and medium-scale mining, and industry to marginal changes in output. Except for agriculture, the output elasticity of export supply was found to be quite elastic. The output elasticity of agriculture was found to be as low as 0.4. However, the low output elasticity of agriculture, as Behrman concludes, implies a shift away from agricultural primary exports toward manufacturing and services. This is in sharp contrast to the Tanzanian case where the failure of agricultural primary exports to grow with the rest of the economy mainly reflects an overall stagnant export sector and an export pessimism.(see chapter III). Implications of such a pattern of export reponse to the economic growth for the country's balance of payments are disscused in chapter VI.

E. The Central Bank Reaction Function

$$\log(DC) = \underset{(-7.20)}{-23.04} + \underset{(7.55)}{3.14}\,\log(Y) - \underset{(-4.18)}{4.02}[\log(Y) - \log(Y)^{*}]$$

$$+ \underset{(3.58)}{0.33}\,\log(TFR) - \underset{(-3.05)}{0.29}\,DUM1 \qquad (V\text{-}3)$$

$$+ \underset{(0.64)}{0.04}[\log(IR) - \log(IR)^{*}]$$

D.W.=1.71, $\bar{R}^2$=0.99

The estimates of the parameters of the central bank reaction function are summarized in equation V-3. On an overall basis, these results are generally satisfactory. No serious problem of serial correlation is evident, and the adjusted coefficient of determination indicates that the hypothesized determinants of domestic credit accounted for about 99 percent of the variation in domestic credit.

In this study, we seek to determine the weights attached to various monetary policy objectives by specifying a reaction function relating the monetary policy indicator (domestic monetary base, DC) as a dependent variable to the statistical indicators of achievement of objectives as independent variables. The latter include economic growth as measured by the rate of growth of real GDP(Y), its deviation from its trend level(Y - Y), and the treasury financing requirements (TFR). A dummy variable is also included to capture structural changes (if any) resulting from the replacement of the East African Currency Board by the Bank Of Tanzania.

As the results indicate, all coefficients have their expected signs and, except for the international reserves variable, they are all significantly different from zero at the 5 percent level. Before providing any interpretation of the results, three points should be made in relation to the specification of the reaction function.

First, the statistical indicator of monetary policy selected (domestic monetary base) may not correspond with the true monetary control variable. As such, the monetary indicator most highly correlated with the policy objectives (independent variable) is not necessarily that which the monetary authorities were in fact seeking to control. Consequently, the results have to be interpreted on the assumption that the domestic credit was the target control variable of the central bank over the period under study. This assumption, however, does not seem to be unrealistic for a small open economy under a fixed exchange rate regime(Ujiie, 1975, Porzecanski, 1979).

Second, assuming that the domestic monetary base is the correct policy target, the coefficients of the reaction function may, as Dewald and Johnson(1963) noted, "in part reflect the monetary authorities' assessment of the trade-off between objectives actually existing in the structure of the economy, as well as their preferences among the policy objectives themselves," (p.174).

Finally, the specification and estimation of the reaction function V-3 is based on the assumption that both the structure of the economy and the way in which monetary policy is integrated with other stabilization policies have not altered substantially over the period under study.

On the whole, the most important variables in the reaction function of the central bank were real GDP, treasury financing requrements, and the gap between the real GDP and its trend level. The estimates suggest a significant and substantial monetization of the central government fiscal deficits by the banking system, and provision of liquidity in the face of economic growth, though with a slower rate during years with an upswings in the level of economic activity.

Real Income and the Bank's Stabilization Objevtive

The coefficient of the real income variable in the reaction function is anticipated to be positive or negative depending on whether the demand-for-money effect or import-demand effect is dominant. As it was pointed out in the earlier chapter, an increase in real income has two contradictory implications for the monetary authorities, as the demand for both money and imports will grow with an increase in real income. The first effect calls for a restrictive monetary policy while the second effect calls for an expansion in domestic credit.

The estimated coefficient on the real income variable in the reaction function suggests that, over the period under study, the monetary authority attempted to maintain a certain level of real liquidity in the economy by assigning less importance to an anticipated balance of payments development. According to the estimated coefficient of real income, a one percent increase in real income would, other things being equal, lead to an increase in domestic credit creation of about 3.14 percent.

However, the coefficient estimate of the target variable representing the central bank's stabilization objective of economic activities ($Y - Y^*$) indicates that while the monetary authority was supplying money to support the level of economic activities, they tended to slow down the process of monetary creation as real income grew at a rate greater than its trend level. The coefficient estimate of [$\log(Y) - \log(Y)^*$] variable was negative and significantly different form zero at the 5 percent level. This result tends to support the hypothesis that the monetary authority generally engaged in a counter-cyclical monetary policy.

Monetization of the fiscal deficits

The estimates also suggest a significant and substantial monetization of central government fiscal deficits by the banking system. According to the estimated coefficient of the treasury financing requirements, a 10 percent increase in the treasury financing requirements, *ceteris paribus*, increases the domestic credit by as much as 3.3 percent. This result is not surprising for a developing country such as Tanzania where the money and stock markets are in their rudimentary stage and where the central bank is obliged to accommodate the growing financial requirements of the treasury (see chapter III).

External Transaction Goal

The target variable representing the external transaction goal is here represented by the overall balance of payments which has been widely used in the literature. The external transaction variable in the central bank reaction function V-3, then represents the desired net foreign reserves less actual reserves. The former is approximated by the twelve-quarter average of nominal imports. This is based on the assumption that the monetary authority desires to maintain foreign reserves equal to four-months of import requirements (see chapter III).

The target variable representing the growth of the foreign reserves had the anticipated sign, but it did not appear to be a consistently significant determinant of the behavior of monetary policy variable. This suggests that while the monetary authorities were heavily concentrating on meeting the financial requirements of the treasury and the maintenance of a certain level of liquidity in the economy, they paid little attention to the other main requirement of economic growth, namely the growth of foreign reserves. Consider the economy's heavy dependence on the imported industrial intermediate and capital goods, a rapid growth in output as envisaged by the policy maker does not seem to be sustainable without a corresponding increase in foreign reserves. However, thanks to foreign aid and the quantitative-restrictive import measures which made it possible for the monetary authorities to continue with their overall expansionary policy (see chapter III).

It should be mentioned that such a pattern of monetary policy is not peculiar to Tanzania. In fact the Tanzanian monetary policy experience does not appear to be significantly different from those of LDC's under a populist government. In examining the rationale behind such monetary policy in the countries located in the southern part of South America, Professor Diaz-Alejandro(1981) wrote,

> the early stages of populist governments are likely to have witnessed substantial expansion in government expenditures not financed by the tax collection.... Across-the-board massive wage increases also accompany the early stages of populist governments. Because these measures will be felt first in output expansion, especially of wage goods, rather than an acceleration of inflation..., the government will be confirmed in the wisdom of its heterodoxy. Pressures on the balance of payments in those early times can be handled by administrative import-repressing mechanism, drawing down reserves, and seeking foreign loans. Even systematic observers warnings of future dangers due to excesses in fiscal, monetary, exchange rate, and income policies will be dismissed by the remark that 'now the economy works differently.' Under those euphoric circumstances concern for economic efficiency, export promotion, and a minimum of concern for fiscal and monetary prudence will be regarded as prima facie evidence of 'reactionary positions' not only by most populist politicians, but also by government economists giving top priority to achieving structural reforms, or seeking a rapid transition to a centrally planned economy, or simply believing the economic efficiency, export promotion, and prudent fiscal and monetary policies are of little consequence for the welfare of most

people in the country (p. 122.)

Lastly, a dummy variable was included in the reaction function in order to capture structural changes (if any) resulting from the replacement of the East African Currency Board with the Bank of Tanzania. The dummy variable takes the value of 1 in the years of 1962-1965 when the Currency Board was in operation and zero for other years of the sample period (1966-1981). The estimated coefficient of the dummy variable was negative and significantly different from zero. This result suggest that the East African Currrency Board pursued a more stringent monetary policy than the Bank of Tanzania. However, this result should be interpreted with caution considering the poor quality of the data on the domestic credit variable during the 1962-1965 period.

On an overall basis, these results compare favorably with the few available ones reported for other LDC's. Porzecanski(1979) estimated a reaction function in which the rate of change in the domestic monetary base as dependent variable is related to the rate of inflation, rate of growth of the real income, and net foreign reserves. Estimating the reaction function for Chile and Argentina it was found that both countries had followed the same pattern of monetary policy, referred to by Porzecanski as pattern B, "supplementing of government revenues through monetary expansion and/or the maintenance of a certain level of real liquidity in the economy even when this means validating, in whole or in part, past inflationary pressures," (p. 435).

In a study on the monetary policy and the balance of payments in Brazil and Chile Miller and Askin (1976) estimated a reaction function in which domestic credit as a dependent variable is related to the real income, its deviation from the trend level of real income and net foreign reserves. Central banks of the both countries appeared to maintain a certain level of liquidity in the economy even though one (Chile) pursued a counter-cyclical monetary policy.

F. Treasury Financing Requirement Equation

$$\log(TFR) = \underset{(-2.20)}{-1.73} + \underset{(2.00)}{2.03}\,\Delta \log(P) + \underset{(3.66)}{0.77}\,\log(IDE)$$

$$+ \underset{(3.72)}{0.45}\,\log(TFR)_{-1} + \underset{(2.84)}{0.57}\,DUM2$$

$$h=0.18,\ \bar{R}^2=0.97 \qquad (V\text{-}4)$$

Equation V-5 presents the parameter estimates of the treasury financing requirements equation(TFR) over the period under study. On an overall level, the results are satisfactory. All the estimated coefficients have their a priori expected signs and h-test indicates absence of an autocorrelation of the residuals. The adjusted coefficient of determination indicates that about 97 percent of the variation in the treasury financing requirements is explained by the variation in the hypothesized determinants of TFR.

Underlying the model are three main hypotheses according to which the current TFR varies directly with the current rate of inflation($\Delta\log(P)$) and the anticipated level of fiscal deficit, as approximated by the implicit deficit(IDE). A one-year lagged TFR is also included in the TFR equation to measure the speed at which the desired level of TFR adjusts to its actual level. The coefficient estimate of the one-year lagged TFR is positive and significantly different from zero at the one percent level. This suggests a relatively high degree of discretionary power exercised by the fiscal authorities to adjust the actual TFR to its desired level in less than two years period. The estimated coefficient on the lagged TFR is 0.45 which implies an estimated speed of adjustment coefficient of about 0.55 ($1/\lambda_3$) and a mean-time lag of about 20 months. This result does not appear to be inconsistent with those reported for the other LDC's. In examining the behavior of government expenditures and revenues for a cross sample of 29 LDC's Khan and Knight (1981) found a mean-time lag of over one year (about 15 months) for fiscal variables to adjust to their desired levels.

Rate of Inflation

The rate of change in prices had a positive and significant imapact on the TFR over the period 1962-1981. This tends to support the Aghevli and Khan's hypothesis which states that in the face of inflation fiscal imbalances tend to widen as the government attempts to maintain its real expenditures (see chapter IV). According to the estimated coefficient of the price change variable one percent increase in the rate of inflation, other things being equal, widens on average, fiscal imbalances by as much as two percent.

Implicit Deficits

In addition to price changes TFR appeared to be greatly influenced by the planned (anticipated) deficit expenditures, as proxied by the implicit deficit (trend revenue minus 'allowable expenditure'). 'Allowable expenditure' in any given year is defined as a constant ratio of expenditure to trend revenue which is equal to the ratio of actual expenditure to actual revenue in the base year.[21] According to the estimated coefficient of the implicit deficit(IDE), a 10 percent increase in anticipated deficits, *ceteris paribus*, will increase TFR by as much as

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[21] The procedure for constructing deficit expenditure is quite straightforward and can be summarized as follows:
1. A regression of actual government revenue against the total nominal exports is carried out testing the hypothesis that for an export enonomy, such as Tanzania economy, revenue is correlated with exports,

$$DR = -\underset{(-5.11)}{1934.2} + \underset{(14.34)}{1.59}\,X \qquad \bar{R}^2=0.91 \qquad \text{V-5(a)}$$

where DR denotes the government domestic revenue, and X total nominal exports. The result tends to support the hypothsis that for an export ecnonomy exports are the main determinant of the government revenue. Exports determine not only the value of export taxes collected by the treasury but also the domestic tax base. The latter is greatly influenced by the import capacity provided by exports.
2. The trend of exports was calculated using,

$$XT = X_0\, e^{gt} \qquad \text{V-5(b)}$$

or,

$$\log(XT) = \log(X_0) + gt \qquad \text{V-5(c)}$$

where XT denotes trend of exports, X_0 actual nominal exports in the base year, g annual average growth rate of export, and t a time trend variable.
3. To obtain trend revenue the estimated coefficients of equation V-5(a) are substitued into an equation with trend exports,

$$DRT = \log(X_0) + g(XT) \qquad \text{V-5(d)}$$

4. Allowable expenditure (GET) is, then, calculated by taking the ratio of actual expenditure to trend revenue in a base year and applying this ratio to trend revenue in each year.
5. Implicit deficit is, then, calculated as,

$$IDE = DRT - GET \qquad \text{V-5(e)}$$

Any expenditure above or below allowable' expenditure' in a given year would be considered the discretionary element of expenditure.

7.7 percent in the short-run(less than one year) and by as much as 14 percent.

Other Variables

TFR has also been hypothesized to vary with the gap between the actual real GDP and its long-run level. This variable is introduced to capture the cyclical character (if any) of fiscal policy over the period 1962-1981. However, this variable did not appear to be significant, even at the 10 percent level. This tends to suggest that fiscal authorities made little use of fiscal instruments in their stabilization policies.

Finally, TFR appear to be affected adversely by the severe drought of 1974-75 and the Uganda war. The dummy variables DUM2 and DUM3 which take value one for the years 1974-75 and 1979-1980 and zero for other years had positive and sigificant non-zero coefficients at the 5 percent level.

G. Aggregate Private Expenditure

$$\log(PE) = \underset{(-0.24)}{-0.15} + \underset{(2.67)}{0.91}\log(Y) - \underset{(-2.43)}{0.32}\,\Pi_{-1}$$

$$+ \underset{(1.73)}{0.11}\log(MS/P)_{-1} \qquad D.W.=1.901,\ \bar{R}^2=0.98$$

(V-5)

Equation V-5 presents the estimates of the parameters in the expenditure equation. On an overall basis, the results appear to be quite satisfactory. With the exception of expected rate of inflation, all variables have their anticipated signs, and serial correlation does not appear to be a problem. The adjusted coefficient of determination indicates that over 98 percent of the variations in the dependent variable are explained by the hypothesized determinants of the aggregate expenditures.

In the basic underlying model aggregate private expenditures (PE,including investment by the private sector and the parastatal sector) are hypothesized to vary directly with real income(Y), the opportunity cost of holding money balances(Π), and one-year lagged real money balances ($(MS/P)_{-1}$).[22]

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[22] The aggregate private expenditure equation V-5 was also estimated using one-year lagged aggregate private expenditures. The latter explanatory variable a priori may have either positive or negative coefficient. A positive coefficient reflects Houthakker-Taylor habit formation, the need for more than one year to adjust actual expenditure to their desired level. A negative coefficient, on the other hand, indicates a Houthakker-Taylor inventory effect. According to the latter effect, stock build up from previous consumption and investment expenditures diminishes the current expenditures. The estimated coefficient of the of the lagged expenditure variabe was found to be negative and

Before analysing the results three points should be noted in the connection to the parameter estimates of expenditure equation V-5. First, the series for the expected rate of inflation, as a proxy for the opportunity cost of holding money balances, was generated by using values of Θ (the coefficient of adjustment in the expected inflation equation V-3(b)) ranging from 0.05 to 1.00. By substituting these series into the expenditure equation, we choose the value of Θ which yields the smallest standard error for the equation. Following this procedure the value of Θ was found to be 0.9 which falls within the range of value for Θ reported for other LDC's.

Second, the estimated coefficients of the expenditure equation V-5 reflect both direct and indirect impacts of the hypothesized determinants on the expenditure. According to the specification of expenditure equation IV-8 of table IV-1, real private expenditures depends on real income and the excess supply of real money balances over the desired ones. The latter are not, however, observable and they are here hypothesized to vary with the real income and the opportunity cost of holding cash balances. Based on the parameter estimates of expenditure equation IV-8 the following set of relationships can be established

$$\lambda_4(e_0 - e_2 a_0) = -0.15 \qquad \text{V-5(a)}$$

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[22] (cont'd) not significantly different from zero even at the 10 percent level. This suggests that the two effects tend to nullify each other.

$\lambda_4(e_1 - e_2 a_1) = 0.91$ V-5(b)

$- \lambda_4 e_2 a_2 = -0.32$ V-5(b)

$\lambda_4 e_2 = 0.11$ V-5(c)

$1 - \lambda_4 = 0.0$

where λ_4 measures the speed of adjustment of the real expenditure to its desired level, e_1 the long-run income elasticity of real expenditure, e_2 the speed at which real money balances adjust to their desired level, and a_1 and a_2 the elasticities of real cash balance in real income and the expected rate of inflation respectively. As can be seen from relations V-5(a) through V-5(e)), the expenditure equation is under-identified. Both parameters a_1 and a_2 enter into the model together and we can not obtain an estimate for either without imposing an apriori constraint on one. To solve this under-indentification problem a_1 was replaced by its estimated value from inflation equation V-5.

Solving the inflation equation V-6 for real money balances the income elasticity of real cash balance (a_1) was found to be 2. This value of income elasticity might appear to be quite high, but it is not unrealistic for a developing country such as Tanzania, where the monetized sector of the economy is rapidly growing and where a relatively large proportion of savings are held in the form of money. Furthermore, this value of real income elasticity of demand for money does not appear to be inconsistent with the results reported for other LDC's. In a study of six Asian countries, Aghevli et al.(1979) the real income elasticities were found to as large as 1.85 for Indonesia and as low as 1.33 for Singapore. Khan and Knight (1981) estimated a monetary model for a cross section of 29 LDC's, and the real income elasticity of demand for money (broadly defined) were found to be 1.2 and significantly different from zero at the 1 percent level.

Third, the results should be interpreted with care due to substantial multicollinearity resulting from the inclusion of money balances and the expected rate of inflation among the independent variables in the expenditure equation. For instance, the partial correlation coefficient between the logarithm of real income and one year-lagged real money balances was about 0.87, and between the logarithim of real money balances and the expected rate inflation was 0.80. Furthermore, the coefficient of determination was increased only by limited magnitude while lagged real money balances were added to the regression.

Real Income and Monetary balances

Among the main determinants of real private expenditure were the real income and the excess money supply. The real income elasticity of expenditures(e_1) is found to be 1.13 and not significantly different from its theoretical value of unity. The impact of the excess supply of real money supply, as measured by the parameter e_2, is positive as expected from the theory and it is only marginally significant at the 5 percent level. The estimated coefficient of the lagged real money balances is 0.11 which indicates that somewhat less than one-eighth of any excess supply of money is reflected in the increase in private expenditures. However, this speed of adjustment of expenditure to the monetary factors in Tanzania might appear to be quite low in comparison to the one reported for other LDC's. In a study on money, income, and the foreign balances Rhomberg(1965) estimated an expenditure equation in which nominal expenditures are related to the current and one year-lagged level of income, and the lagged nominal money balances. Estimating the expenditure equation for a sample of four developed and developing countries the coefficient estimates of the lagged money balances was found to be as large as 5.0 for Ecuador and 2.8 for Costa Rica. Aghevli and Khan(1980) also estimated an expenditure equation similar to the expenditure equation (IV-8) for eight LDC's. The estimate coefficients of the lagged real money balances were found to be as high as 0.78 for Phillippines and 0.73 for Brazil, and as low as 0.08 for Mexico. In a study of prices, output, and trade balances in Iran Aghevli and Sassanpour(1982) found lagged real money balances to be the most significant variable in explaining the behavior of real private expenditures. The estimated coefficient of the logarithm of lagged real money balances was reported to be about 0.43 which indicates that somwhat less than half of any excess supply of money is reflected in the increase in private expenditures.

The sluggish response of private expenditure to the excess money supply in Tanzania, as suggested by the expenditure equation V-5, might be due to (a)a persistent market disequilibrim resulting from the government price control measures, and (b)the government's discriminatory investment policy toward the private sector. During the period under study, the government relied increasingly on the investment and price policies which tended to give priority to public ownership and control while leaving less room for the private sector and market forces. Under such circumstances, the actual realized money balances, as Tucker(1971) noted, would be different from the 'effective demand' for money with the result of an unwanted accumulation of cash balances by the public (see chapter III).

Other Variables

Aggregate private expenditures are also hypothesized to vary directly with the opportunity cost of holding cash balances, as proxied by the expected rate of inflation and the credit restraint variable. The latter was approximated by the logarithm of one less the domestic credit income ratio ($\log(1 - DC/Y)$). The estimated coefficient of credit restraint variable was negative as anticipated but it was not significantly different from zero, so it was dropped out from the last version of expenditure equation. However, the expected rate of inflation appeared to play a significant role in influencing the behavior of real private expenditures over the period under study. The coefficient estimate of the expected rate of inflation was negative and significantly different from zero at the 5 percent level. This finding is not consistent with the real money balance hypothesis according to which the desired demand for real cash balances varies inversely with the opportunity cost of holding real money balances. However, such a negative response of real private expenditures to the expected rate of inflation, as Behrman(1977) noted for the case of Chile, "probably reflects the relative inability of households to defend their share of the command over goods in the face of high inflation rates" (PP.159, 162.) The negative response of real private expenditures to the expected rate of inflation may also be due to an inappropriate specification of expectations in our model.

H. The Price-Change Determination Equation

$$\Delta\log(P) = \underset{(1.59)}{0.08} + \underset{(2.19)}{0.33}\,\Delta\log(MS) + \underset{(1.69)}{0.25}\,\Delta\log(MS)_{-1}$$

$$- \underset{(-2.39)}{1.20}\,\Delta\log(Y) - \underset{(-1.73)}{0.26}\,\Delta\log(TS)_{-1}$$

$$+ \underset{(1.64)}{0.16}\,\Delta\log(ZP.R)$$

$$D.W.=1.71,\ \bar{R}^2=0.37 \qquad (V\text{-}6)$$

Equation V-6 presents the parameter estimates of price-change determination equation over the period 1960-1981. From an overall view point, these estimates appear quite satisfactory. The coefficient estimates have generally their a priori anticipated signs and no serious problem of serial correlation is obvious. The adjusted coefficient of determination indicates that the specification is consistent with 37 percent of the variation in the dependent variable over the sample period. The adjusted coefficient of determination may appear to be low in comparison to the others reported in table V-1, but it should be noted that the variation in the rate of inflation to be explained is quite considerable, ranging from -0.8 to +22.3 percent.

Furthermore, the dependent variable in equation V-6 is expressed in terms of rate of change rather than levels as is the case for other equations of the model. This makes it difficult to compare the performance of inflation with other equations using R^2.[23]

As is evident from equation V-6, the constant term is not significantly different from zero at the 5 percent level, indicating that the hypothesized determinants appearing in the price-change determination equation V-6 fully account for the mean rate of inflation observed in Tanzania over the period under study.

In the basic underlying equation V-6 the rate of change of the consumer price index is hypothesized to vary with the level and the rate of excess demand pressures in the output market, which in turn depends upon the positions and rates of movements of demand and supply due to both domestic and foreign conditions. More specifically, the rate of change of the consumer price index is assumed to vary with (a)excess demand varaiables; (b)disequilibrium pressures between the supply and demand; and (c)supply shift factors. The estimates of the price-change determination equation V-6 support the proposition that major direct determinants of inflation rate over the period 1962-1981 were changes in the aggregate demand due to changes in the money balances. Also statistically significant were the rate of change of output, and the disequilibrium pressures between demand and supply. Except for the rate of changes of import prices, the supply-shift factors appeared to be not significantly different from zero, and so they were dropped out from the final version of inflation equation.

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[23] Equation V-6 has been estimated for other LDCs. Reported R^2 range considerably from as low as 0.231 for India to as high as 0.994 for a pooled sample of twenty LDCs (Glytsos, 1977, table 3).

Excess Demand Pressure Variables

The adjustment of the rates of change in nominal money supply is of considerable interest here. As it is evident from inflation equation V-6, the response of the inflation rate to the rates of change of current and one year lagged money supply is positive and significant, though the latter is significant only at the 10 percent level. According to these estimates a 1 percent increase in the rate of growth of money supply, *ceteris paribus*, tends to increase the inflation rate by about 0.33 percent in the current year and by about 0.25 percent in the following year.[24] Consequently, the total accumulated responses of price changes to a 1 percent increase in the nominal money supply is about 0.58 which is less than its theoretical value of unity.

These results are not inconsistent with those reported for other low-income and low-inflation LDC's. As the study by Glytson(1977) for 36 LDC's clearly indicates, the nominal money supply appears to be generally more inflationary in the high-income LDC's (countries with a per capita income of greater than $250) with a coefficient of 0.91, compared with a coefficient of 0.66 in the low-income LDC's. This, as

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[24] The inflation equation V-6 was originally estimated for the rate of growth of money supply lagged up to 5 years. The coefficients of the current and one-year lagged money supply growth rates were only found to be statistically significant.

Glytson noted, can be justified by the higher degree of monetization and the more roundabout production in the high-income LDC's. Under such circumstances, it takes more time for output supply to respond to an increase in the nominal money supply, and it is then more likely to have a stronger impact on price changes in the high-income LDC's than in the low-income LDC's. Furthermore, the sluggish response of price to changes in the money supply might be due to the complex system of price control measures and various government subsidization programs. Both the process of monetization of the subsistence sector in 1960's and the price control measures of the 1970's, as pointed out in the earlier chapter, contributed significantly to the rapid increase in the money-income ratio (see chapter II).

Three important aspects of price reponses to the changes of the nominal money supply are worth mentioning.

i)The importance of changes in the money supply in this model does not mean that a lack of monetary discipline by the Bank of Tanzania is underlying the development of prices in Tanzania over the period under study. The money supply is, in fact, an endogenous variable and as the estimates of the central bank reaction function indicate, the behavior of the domestic monetary base is greatly influenced by the treasury financing requirements. These results, then, tend to support Behrman's finding for Chile(1977) and Glytsos's finding for 36 LDC's that growth in money supply is the proximate 'cause' of much of Tanzanian inflation, not that it is the underlying fundamental source.

ii)The sluggish response of prices to changes in the money supply, as suggested by equation V-6, implies much greater difficulties in eliminating inflation in the short-run. This difficulty becomes more serious considering the asymmetrical nature of the monetary instruments available to the monetary authorities. As Park(1976) pointed out in his study of effectiveness of monetary policy in LDC's, it is much easier for a developing country central bank to increase both level and rate of growth of the money supply than to reduce them. This is mainly related to factors such as (a)the relatively high proportion of the money supply which is held in the form of currency and notes by the public, and (2) the non-existence of open market operations in many LDC's.

iii)The absence of a strong interrelationship between the inflation rate and changes in the money supply as suggested by the price-change determination equation V-6 might also indicate the importance of supply shift factors, such as import price changes and disequilibrium between demand and supply.

Real Income

Movements in the consumer price index over the period under study also appeared to be influenced greatly by changes in real income. The coefficient estimate of changes of real income was negative and significant at 1 percent level, indicating the dominance of the positive effect of higher income on desired real balances. According to the estimated coefficient of real income a 1 percent increase in the real income, *ceteris paribus*, lowers the inflation rate by about 1.2 percent

Disequilibrium Pressures between the Demand and Supply

In addition to changes in the money supply and of real income, demand pressures relative to supply were also found to be significant in explaining the price development in Tanzania over the period under study. In an attempt to represent demand pressures relative to supply, several variables for which consistent data available were included in the price-change determination equation V-6. These included the deviation of real income from its trend ($(Y - Y^*)$); adjusted nominal GDP growth (the excess of the growth rate of nominal GDP over the long-run level of GDP); and the total supply of goods available to the domestic economy (TS). Following Diaz-Alejandro(1972) total supply of goods available to the domestic economy was approximated by the actual agricultural output (excluding export crops) and merchandise imports.[25]

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[25] The approximation of disequilibrium pressures between supply and demand by the deviation of actual real income from its normal level performed quite poorly. The use of the latter proxy appeared to overestimate the actual productive capacity of the economy and thereby understimating the extent of demand pressures in the commodity market. This may be, among other things, due to the rapid growth of the service sector in general and public administration in particular over the period under study (see chapter III).

As is evident from the price-change determination equation V-6, the coefficient estimate of the disequilibrium pressure variable ($\Delta\log(TS)$) has its expected sign and it is significant only at the 10 percent level. A 10 percent increase in the total supply of goods available to to the domestic economy, things being equal, tends to dampen the price increase by about 2.6 percent. This suggests a fairly insubstantial response to aggregate demand-supply conditions beyond that captured by by changes in money supply and in the real income. This result is consistent with Behrman(1977)'s finding for Chile, and Diaz-Alejandro(1972) for Colombia. In estimating price-change behavior in Chile, Behrman approximated disequilibrium pressures between the demand and supply by the inventory level relative to GDP, sectoral capacity utilization, and the total demand facing a sector relative to its capacity. The disequilibrium pressures between the demand and supply were found to be insignificant for manufacturing, housing, and the services. Diaz-Alejandro also found disequilibrium pressures between the demand and supply, as approximated by changes in the real supply of agricultural output (excluding coffee), and merchandise imports to be statistically insignificant in explaining the behavior of price changes in Colombia.

Supply Shift Factors

With the exception of import price changes, none of the supply shift factors, or cost-push type variables appeared to be statistically significant in explaining the development of prices in Tanzania over the period under study. The estimated coefficient on the import-prices changes was significant only at the 10 percent level. A 10 percent increase in the import prices, other things being equal, tends to increase the overall consumer price index by only 1.6 percent. This result is not inconsistent with other results reported for low-income LDC's. In his study of 36 percent LDC's Glytsos(1977) found the import-price elasticity of the price equation to be generally as low as 0.014 for the low-income LDC's and as high as 0.25 for the high-income LDC's.

The relatively low coefficient of the import-price change variable, as Glytsos noted, may be due to the low share of imports in total consumption expenditures in the low-income LDC's. The same reasoning may also be given for the insignificance of effective indirect taxes. Over the period under study, only a few consumer items were subject to sale or excise taxes. As late as the fiscal year 1981, taxes on the beverages and tobacco alone accounted for about 60 percent of the total indirect taxes (*Annual Economic Survey*, 1981). With regard to wages, their insignificant role in the development of prices over the period under study may be related to several factor such as (a)absence of a militant trade union and labor contracts, and (b)the minimum wage law legislation.

In addition to the structural and institutional factors discussed above, the passive response of prices to cost-push factors, as suggested by equation V-6, may be explained by the way the monetary factors are incorporated into the price-change equation. According to the "pure monetary hypothesis" the inclusion of wage and import price changes and other cost-push factors would not improve the explanation of movements in the rate of inflation if monetary factors had been adequately taken into account (Harbeger, 1963). Thus, if the monetary authorities fully finance changes in wages and the other supply shift factors, as the Tanzanian monetary authorities did in fact over the period under study, there would be no strong reasons to expect that cost-push type variables would add significantly to a monetary explanation of price-change determination.

I. A Summary of Main Findings

The purpose of this chapter has been to estimate the model outlined in the previous chapter using annual data from 1962-1981, and to test the validity of the model. The results showed that the model did well by both economic and statistical criteria. Most of the structural equations appeared to be well specified with high coefficients of determination.

Before summarizing the main findings of this chapter, it should be noted that these results must be interpeted with caution. The model tested in this study was highly aggregated and the data used were sometimes of dubious quality. The sample size was also small and there were a large number of exogenous variables which could introduce some bias into the estimates of the structural equations. Furthermore, the annual data and the small size of the sample prevented us from introducing a more complex lag structure in order to examine more accurately the speed af adjustment of policy variables. As the result, the estimates might be subject to specification errors.

Despite these shortcomings and inadequacies, the results tend to suggest the usefulness of the model in examining the process of balance of payments adjustment and credit creation in a small open developing economy with a fixed exchange rate regime, such as the Tanzanian economy. Both imports and exports were found to be quite sensitive to price changes, though the short-run price elasticities were not substantial. Imports were also influenced by real aggregate expenditure and the government foreign sector policy restrictiveness. The most striking finding was that the productive capacity of the economy to produce primary exports appeared to lag substantially behind the growth experienced by the economy as a whole over the period under study.

Real private expenditures were mainly determined by real income and the excess supply of real money balances. The latter appeared to be only marginally significant, mainly due to the prevailing price control measures, widespread shortages, and a generally unfavorable political and economic environment for private investment. In contrast, government expenditure experienced quite rapid growth which was not matched by the growth of domestic tax revenue, and had to be financed by borrowing from the domestic banking system and overseas. Both inflation and anticipated fiscal deficit appeared to play a significant role in the development of budget deficits over the period under study. The parameter estimates of the treasury financing requirements also suggested that the fiscal authorities did exercise a certain degree of discretionary power over the fiscal variables under their control. Futhermore, the results sugggested that the fiscal authorities made little use of fiscal variables under their control to smooth the fluctuations in the output and foreign reserves.

Monetary factors appeared to influence not only expenditures and thereby imports, but also the development of price changes in Tanzania. Rates of growth of money balances (both current and the past) were the most significant determinants of the price changes in Tanzania over the period under study. Disequilibrium pressures between demand and supply also appeared to add significantly to the explanation of price-change determination beyond what had been captured by the monetary factors. An increase in agricultural output (excluding export crops) and merchandise imports also appeared to have a dampening effect on the inflation rate. However, except for import prices, other cost-push factors did not turn out to be significant.

With regard to the process of credit creation, the parameter estimates of the central bank reaction function suggested that the monetary authorities accommodated the treasury financing requirements and provided liquidity in the face of economic growth, though at a smaller rate during the booms. However, the monetary authorities appeared to pay less importance to the anticipated balance of payments developments resulting from such an expansionary monetary policy.

VI. MODEL VALIDATION: A SIMULATION ANALYSIS

The purpose of this chapter is to examine the economic and statistical properties of the entire model described in chapters IV and V. The first section of the chapter uses the estimates of the structural model described in table V-1 to evaluate the model's ability in tracing the historical data. In the second section, several simulation experiments are carried out to explore the consequences of changes in policy variables and in the other exogenous variables on the key macroeconomic variables of the model.

A. Model Validation

In the previous two chapters, we discussed the economic and statistical properties of the structural parameters of the model for each individual equation without making any reference to properties of the entire model. In what follows we examine the two commonly known properties of the entire model;

1. goodness-of-fit: How well does the system of equations (IV-1) through (IV-10), as a whole, reflect the economic reality? and
2. Multiplier analysis: Given a change in an exogenous variable or in other policy variable, how does it affect the time path of the endogenous variables?

Model Validation -- Goodness-of-fit

In the context of single equation models validation presents a less serious problem than in the context of a simultaneous equation system. In the former case one usually looks at a set of summary statistics, such as the coefficient of determination and t-statistics to evaluate the ability of the model in explaining the historical data. However, in the case of a simultaneous equation system, the use of these statistics may give a misleading picture of the goodness-of-fit of the model(Pindyck and Rubinfeld, 1976 and Klein and Young, 1980). For example, it is possible that every individual equation of the system performs well on the basis of the individual-equation procedures but that the system as a whole may reproduce the historical data very poorly.

There is no generally recognized method of statistical inference available for validating a simultaneous equation system. The available validation methods are quantitative and descriptive and they are not generally on probability calculations from established distributions. As a result, acceptance of a model as a useful forecasting tool is, as Klein and Young (1980) put it, still largely a matter of good judgment.

In order to examine how well the Tanzanian model of the balance of payments reflects economic reality, we utilized the most commonly-used procedure for model validation, namely the dynamic simulation.

Simulation Analysis

The ability of the model to track the historical time paths of its endogenous variables is generally considered to be the most important of all evaluation procedures for validating a model. Simulation analysis basically consists of two steps; (a)solving simultaneously the full set of equations (including identities); and (b)comparing the sequence of solution values obtained from step one for each individual variable with its corresponding historical time path over the simulation period. The mechanics of the evaluation of within-sample tracking performance is relatively straightforward. To make the presentation as simple as possible, the simultaneous equation system described in tableIV-1 can be written in matrix form as follows

$$A\ y_t = B\ x_t + C\ y_{t-1} + u_t \qquad \text{(VI-1)}$$

where y is a (12*1) column vector of endogenous variables, y_{t-1} a (12*1) column vector of endogenous variables lagged one period, x a (26*1) column vector of exogenous variables, and u a (12*1) column vector of residuals which is asuumed to be white noise. Solving the simultaneous equation system VI-1 for the endogenous variables we obtain

$$y_t = A^{-1}\ B\ x_t + A^{-1}\ C\ y_{t-1} + A^{-1}\ u_t \qquad \text{(VI-2)}$$

or

$$y_t = \Pi_1\ x_t + \Pi_2\ y_{t-1} + e_t \qquad \text{(VI-3)}$$

where

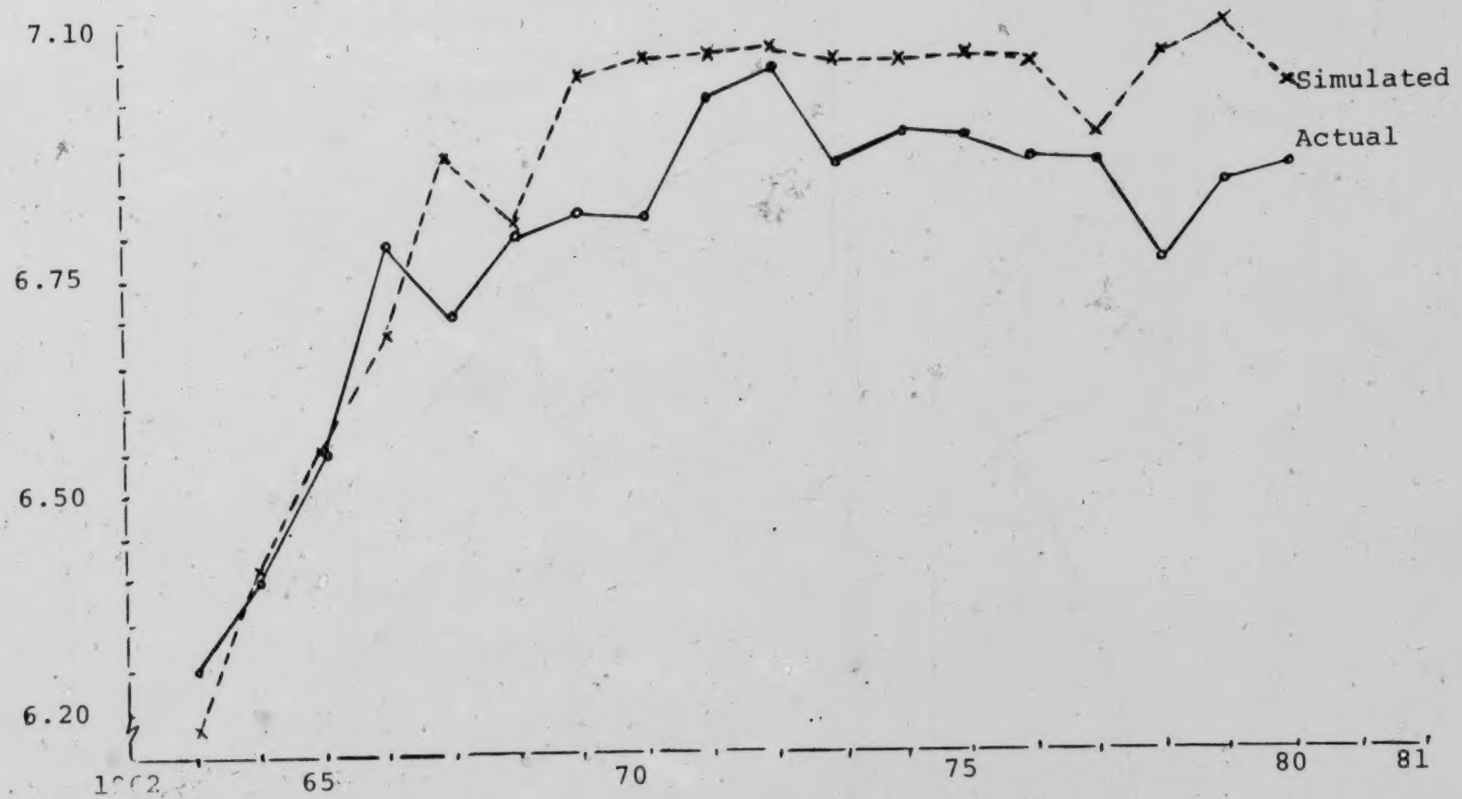
$\Pi_1 = A^{-1} B, \Pi_2 = A^{-1} C$, and $A^{-1} u_t = e_t$

The equation system VI-3 is known as the reduced form of the structural model VI-1. The reduced form expresses the solution of each endogenous variable in terms of predetermined variables and residuals at sample point t. The full set of equation VI-3 can be solved using the historically observed values for both the exogenous variables as well as the lagged endogenous variables. Or alternatively, the equation system VI-3 can be solved using the historically observed values for the exogenous variables and the generated solution values of the lagged endogenous variables when they fall within the model simulation period. The former solution is generally referred to as a one-period or static simulation and the latter as a dynamic simulation. A dynamic simulation clearly provides a more stringent test of the model than a static simulation. In contrast to the static simulation which avoids problems of accumulation of simulation (forecast) error by correcting the model every period, a dynamic simulation accumulates the simulation error and thereby reveals the dynamic properties of the model.

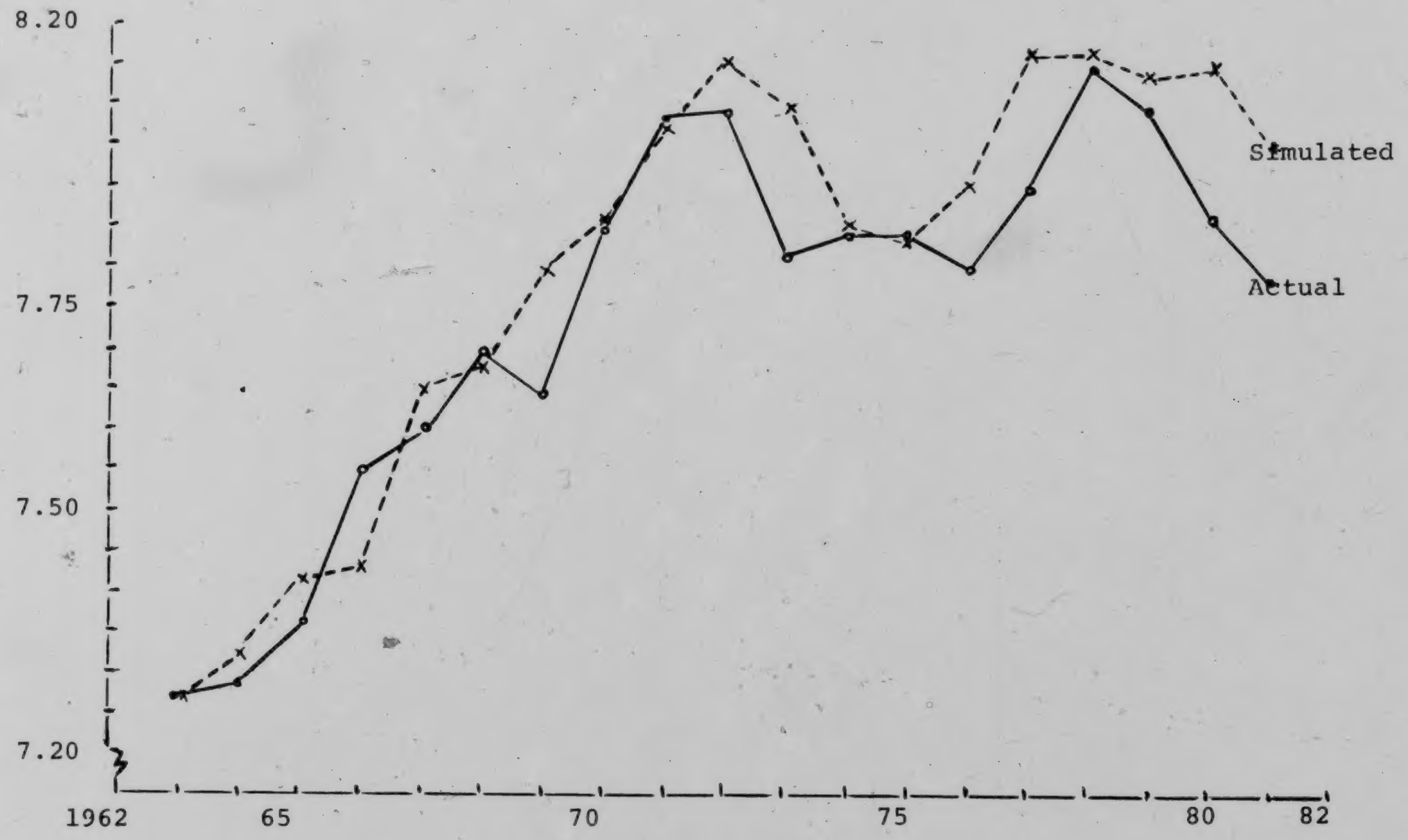
The second step in simulation analysis involves comparing the simulated (forecast) values of the endogenous variables with their corresponding observed vales. The comparison between the actual and simulated values can be viewed as a test of the tracking performance or goodness-of-fit of the model. Furthermore, such a comparison may isolate the problem areas of the model which then make it easier to improve the specification of the model. The simulation results are shown in figures VI-1 through VI-10.

The simulation results show that the model is fairly accurate in tracking the movements in the endogenous variables and most of the turning points are identified quite well over the sample period. However, as it is evident form figure VI-4 the model peforms poorly in explaining the rate of inflation. Although the model picks up the most of the major turning points over the sample period, it tends to overestimate considerably the rate of inflation over the 1963-1965 period. The poor tracking performance of the model may be related to the poor quality of monetary data for the period 1962 - 1965 (see chapter IV, section A.1).

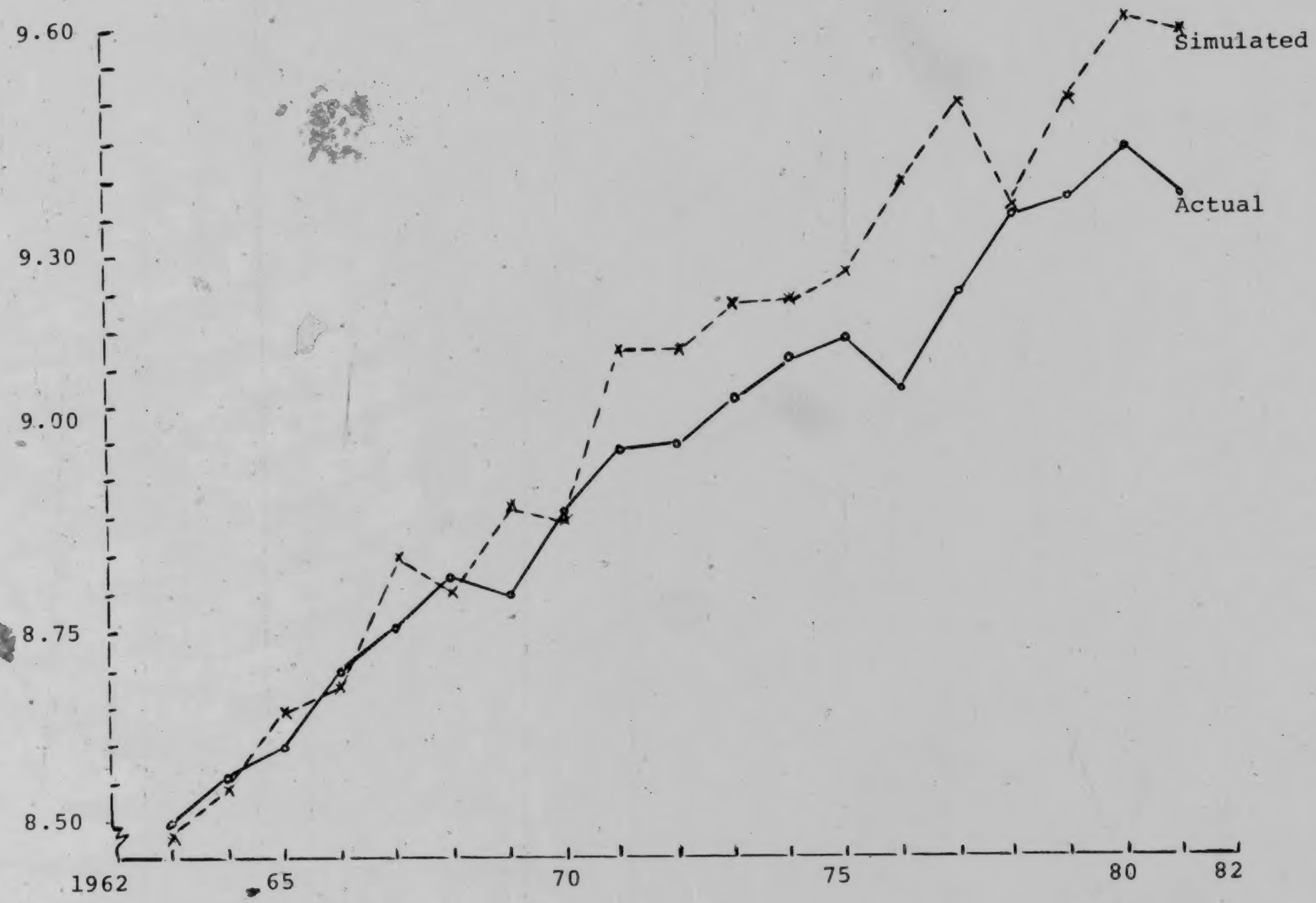
FigureVI-1. Primary Exports.



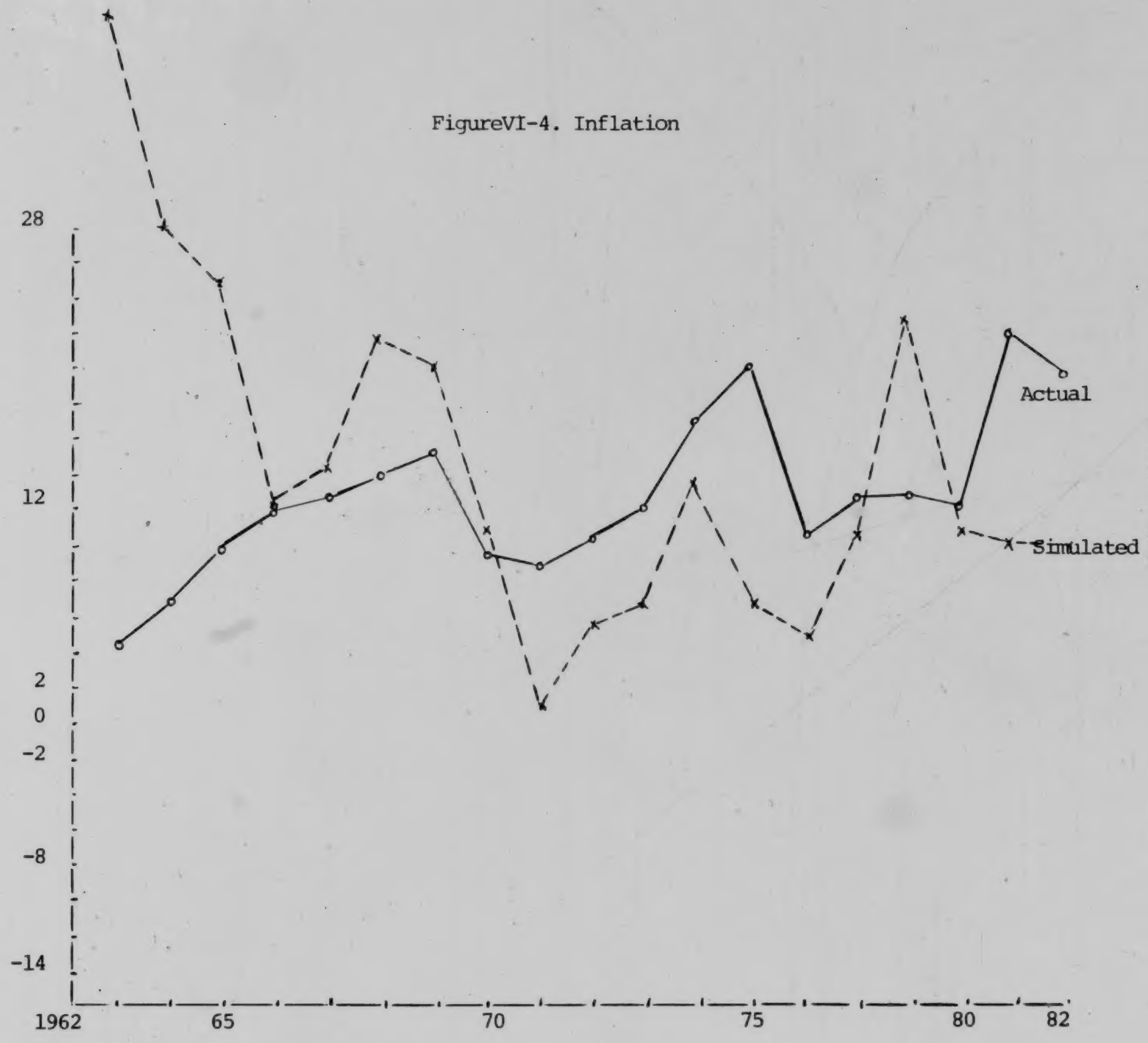
FigureVI-2. Imports.



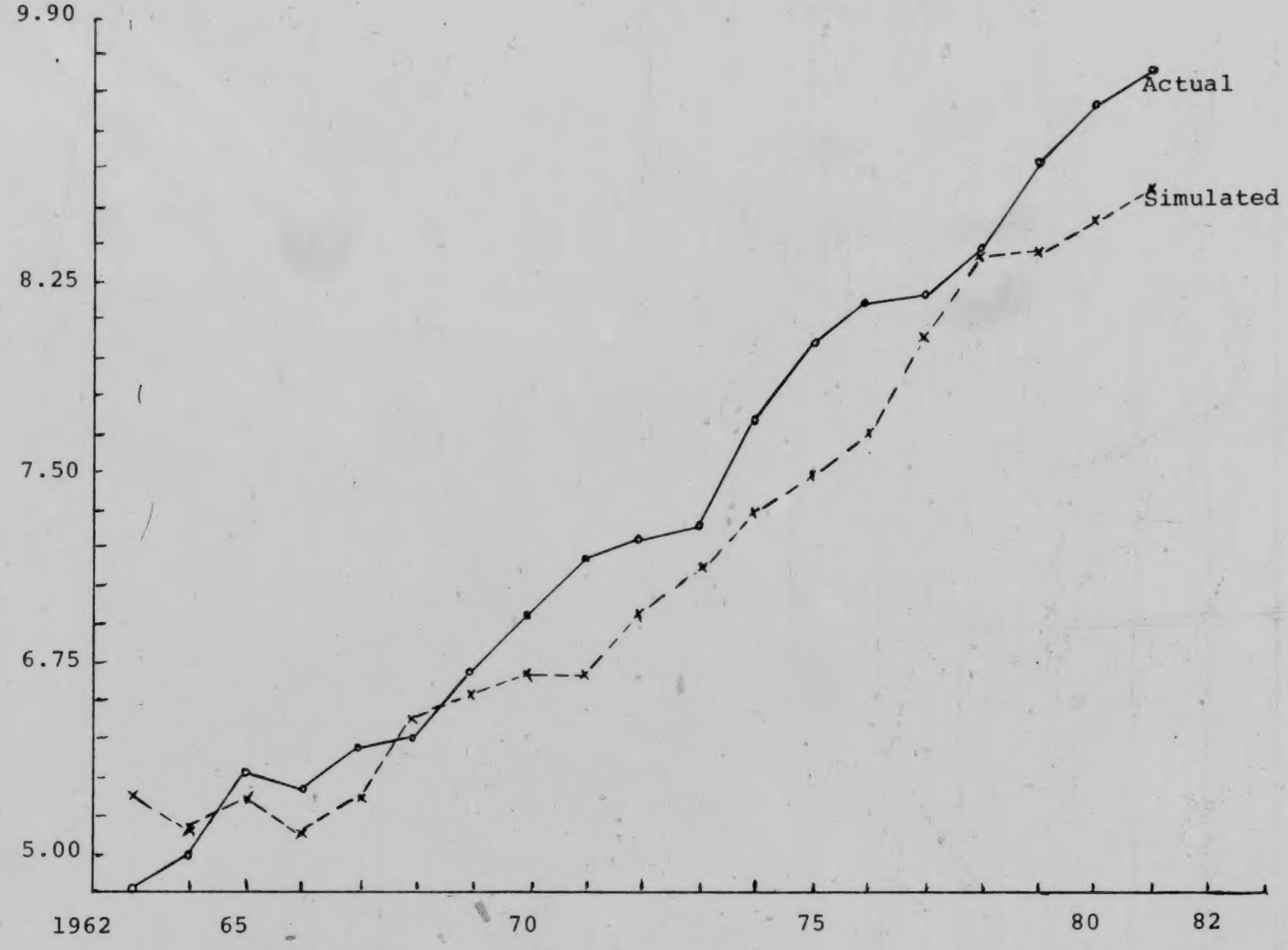
FigureVI-3. Private Expenditure.



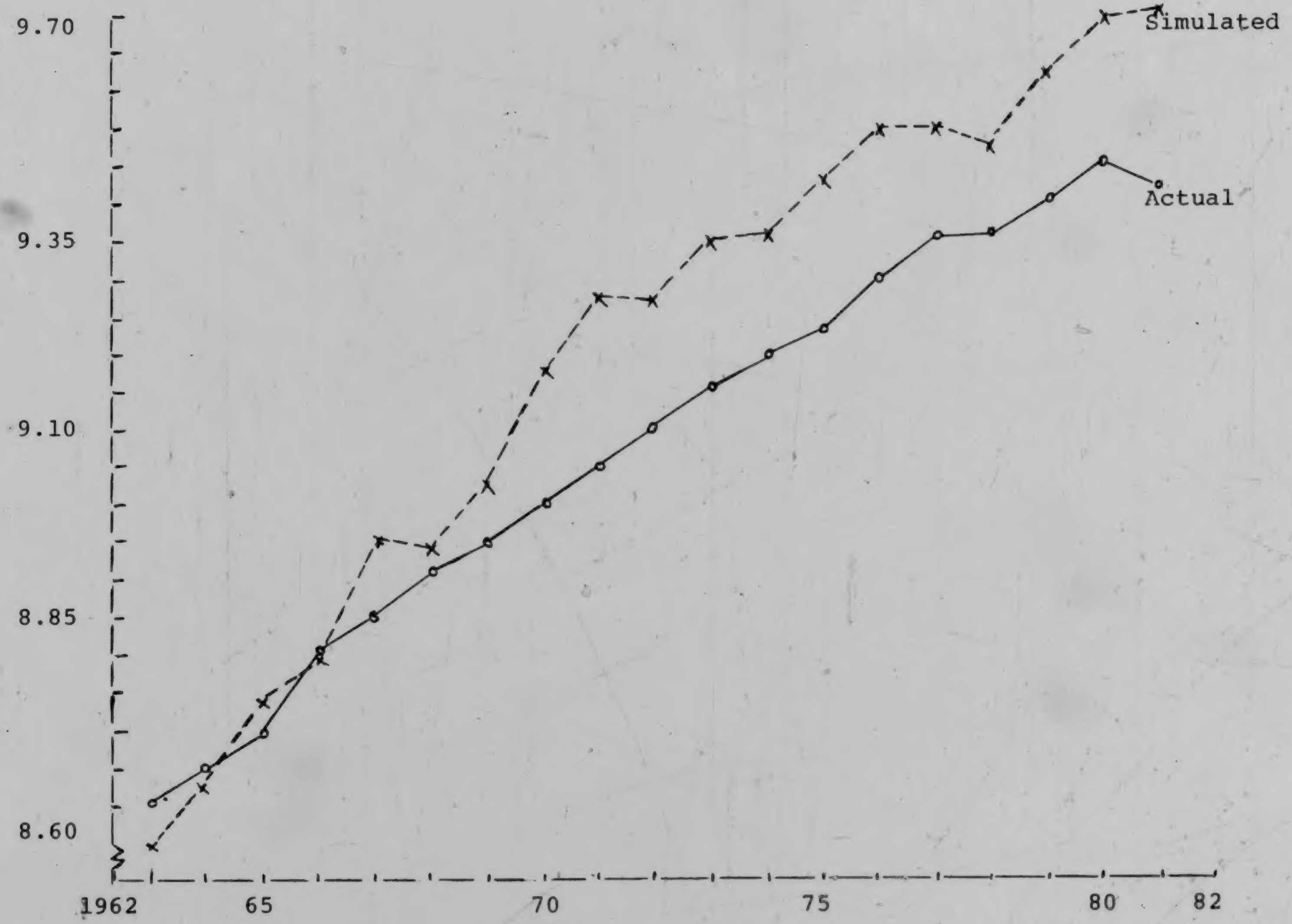
FigureVI-4. Inflation



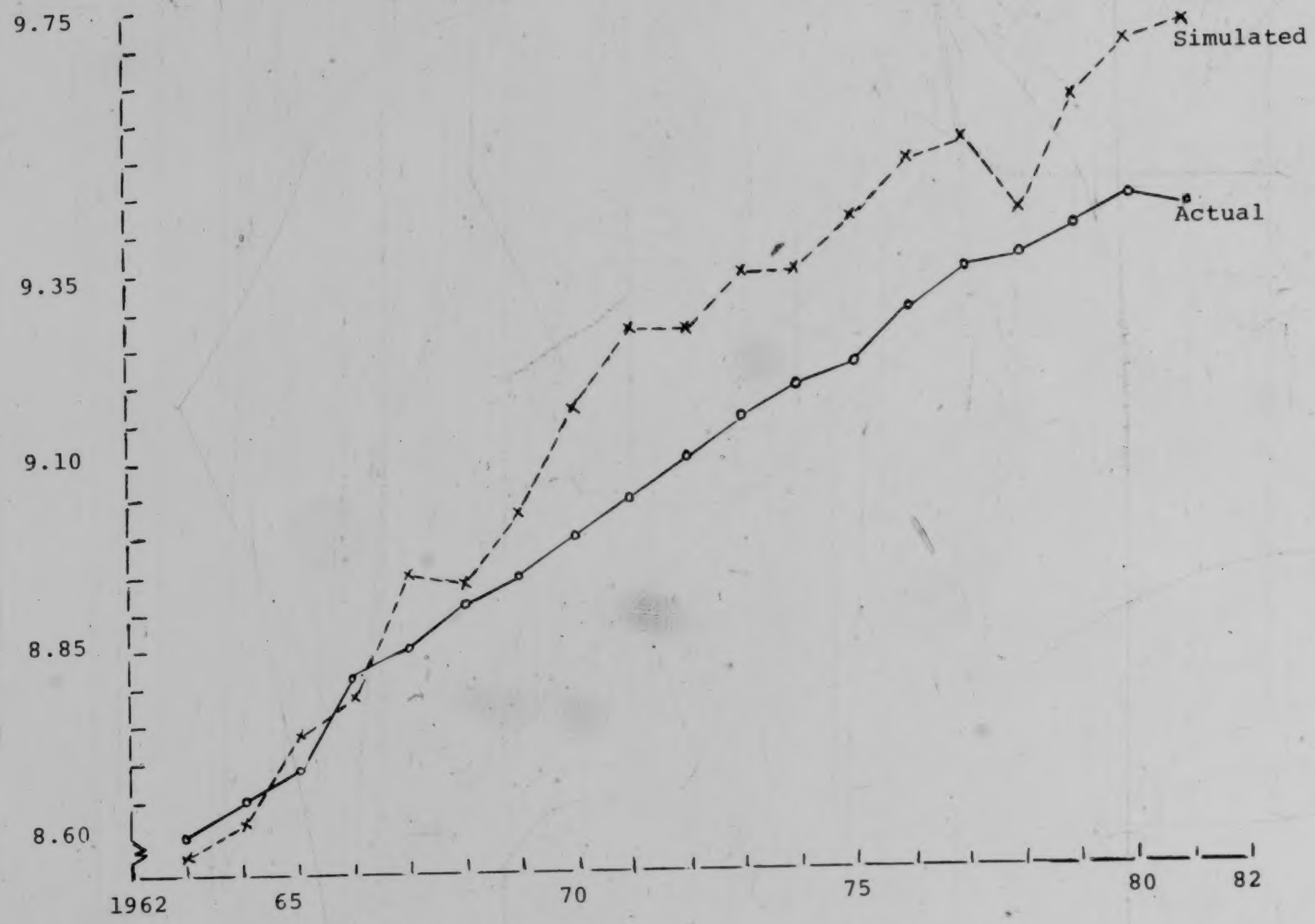
FigureVI-5. Domestic Credit.

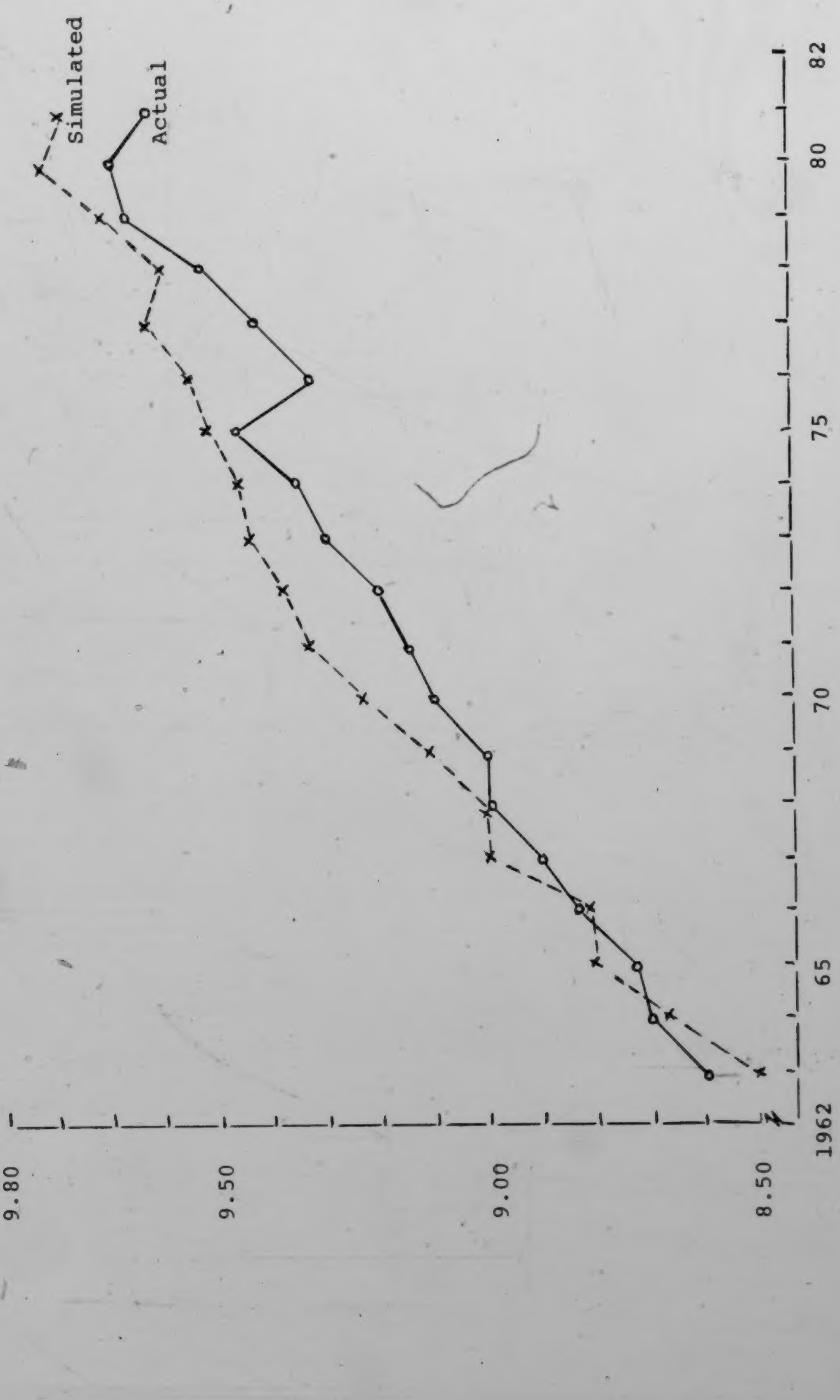


FigureVI-6. Government Total Deficit.



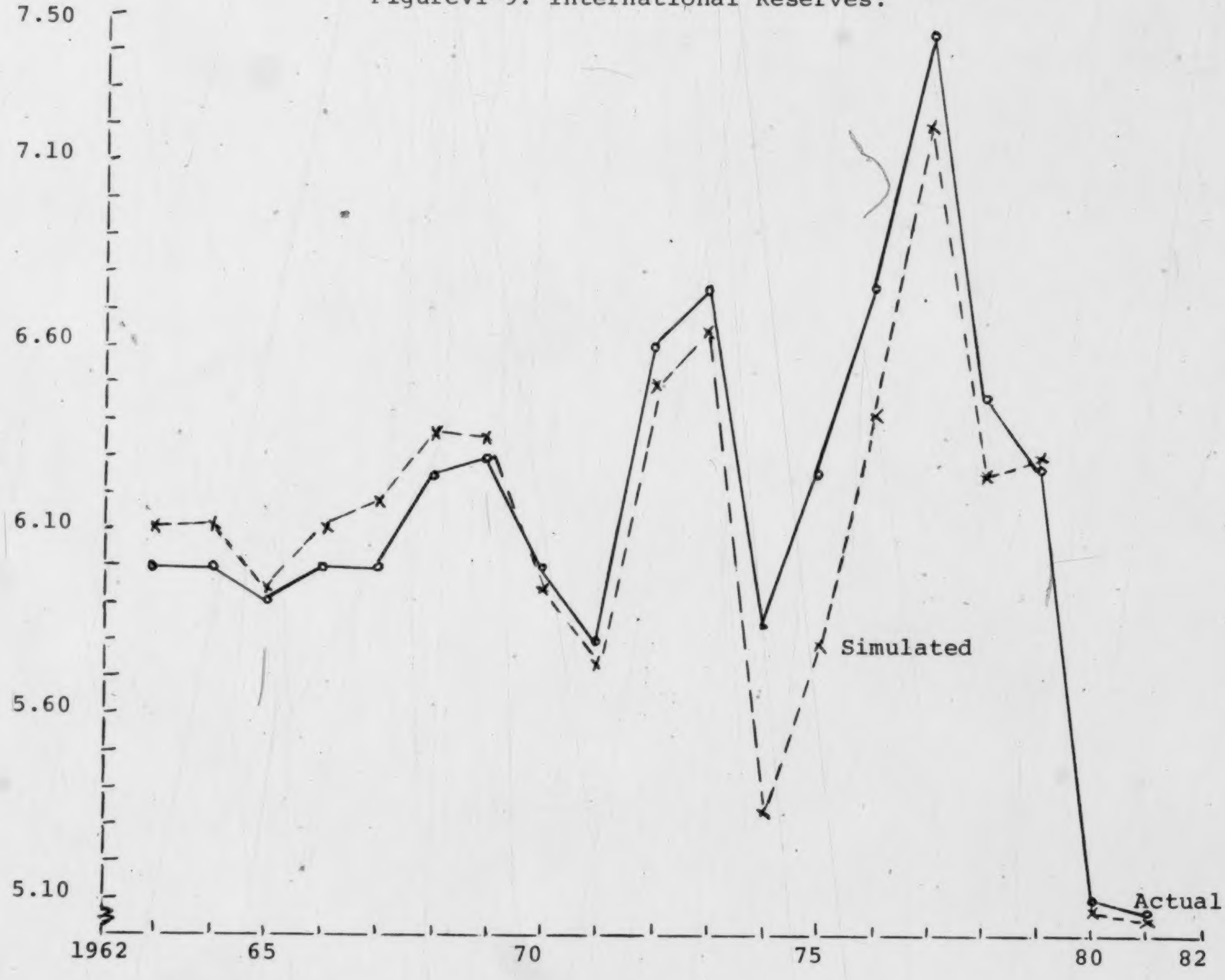
FigureVI-7. Real Income.

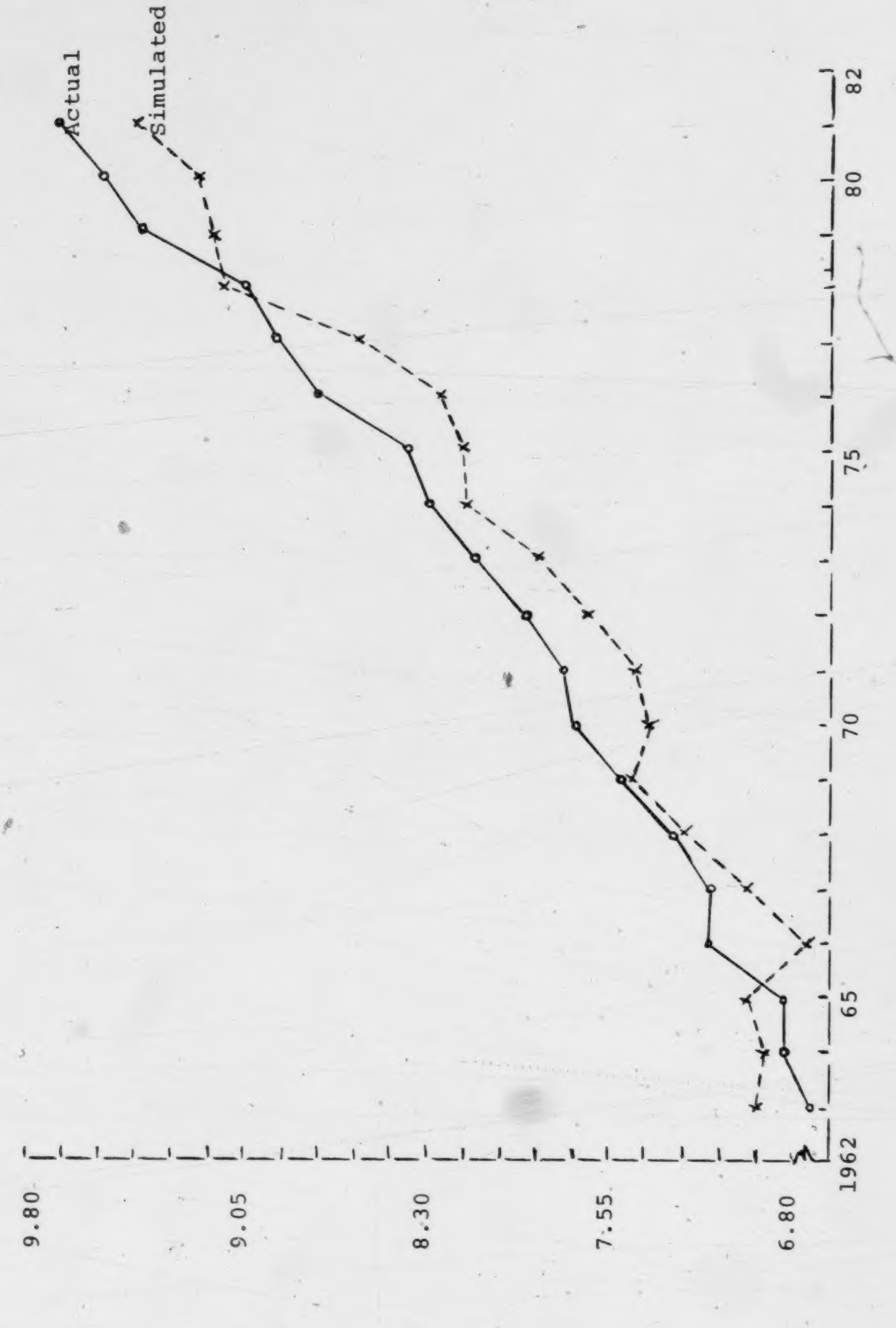




FigureVI-8. Aggregate Expenditure.

FigureVI-9. International Reserves.





FigureVI-10. Money Supply.

Summary Forecast Accuracy Measures

To decide more precisely the closeness of the simulated time paths of the endogenous variables to the actual variables, we need to go beyond visual inspection and look for some statistical measures of forecast accuracy. The three most common measures of forecast accuracy that have been used to evaluate a model performance are root mean square error (RMSE), mean square percentage error (RMSPE), and Theil inequality coefficients (U).

$$RMSE = \sqrt{1/T\ \Sigma\ (P_t - A_t)^2}$$

$$RMSPE = 100 * \sqrt{1/T\ \Sigma[(P_t - A_t)/A_t]^2}$$

$$U = \sqrt{1/T\ \Sigma(p_t - a_t)^2/\Sigma a^2_t}$$

where

T = number of periods of simulation,

A_t = the actual value of an endogenous variable in period t,

P_t = the predicted or forecast value for the same period, and

a, p = the relative change of A and P respectively.

These measures of forecast accuracy, as can be seen from relationships VI-4 through VI-6, measure basically the extent to which the forecast value of an endogenous variable (P_t) deviates from its actual value (A_t) in period t. All summary measures have a lower limit of zero corresponding to perfect tracking for the endogenous variables concerned. The smaller the deviation between the actual and simulated time paths of the endogenous variables, the closer to zero are the values for the summary measures of forecast accuracy. The value of U is one for a no-change forecast and greater than one if the forecast is less accurate than the simple forecast of no change.

Table VI-1 shows RMS, RMSPE, and Theil's inequality coefficient.Table VI-1 also shows the decomposition of sources of the the forecast errors.[26]

Some care must be exercised in the choice of summary measures for the evaluation of the model. First, RMSPE is generally preferred to RMSE for the simple reason that RMSPE is expressed in percentage terms and it is easier to interpret than RMSE which is measured in the same unit as the endogenous variable concerned. However, RMSE is preferred to RMSPE if the actual values of endogenous variables are small such as the rate of change of endogenous

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[26] Further insight into sources of forecast error may be obtained by the following decomposition of the mean square error(MSE), as suggested by Theil(1966)

$U^{M} = (\bar{a} - \bar{p})^2 / MSE$ (bias proportion)

$U^{R} = (S_p - r S_a)^2 / MSE$ (regression proportion)

$U^{D} = (1 - r^2) S_a^2 / MSE$ (disturbance proportion)

where, $\bar{p}$, and, $\bar{a}$, are the means of predictions and actual values, S_p and S_a the standard deviation of the predicted and actual values, and r the correlation coefficient. The regression proportion measures the extent to which the magnitude of MSE is due to difference of the regression coefficient $b(p = \hat{b}\, a)$ from unity. The disturbance component is the variance of the residuals obtained by regressing the actual relative changes over the predicted ones.

Table VI-1. Estimated Predictive Accuracy Measures for the Sample-period Forecast (1963-1981)

Variables	RMSE	RMSPE	U	Decomposition of the forecast error		
				Bias	Regression	Residuals
PX(primary exports)	0.247	0.836	0.018	0.821	0.121	0.057
Z(imports)	0.114	0.355	0.007	0.462	0.163	0.409
PE(private expenditues)	0.255	0.649	0.014	0.819	0.122	0.059
DC(dometic credit)	0.353	1.031	0.022	0.365	0.203	0.431
TFR(Treasury financing requirements)	0.500	1.685	0.036	0.009	0.179	0.819
Y(real income)	0.185	0.467	0.010	0.629	0.279	0.090
IR(int. reserves)	0.207	0.776	0.016	0.083	0.015	0.915
MS(money supply)	0.227	0.638	0.013	0.034	0.070	0.890
Δ log(P)	0.211	28.800	0.600	0.017	0.878	0.100
Δ log(P)*	0.125	13.500	0.440	0.120	0.620	0.259

* Excludes 1962-65..

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variable(e.g. inflation) or if the observed values of the endogenous variable switch frequently between positive and negative values (e.g. Balance of trade). Under such circumstances, a modest simulation error in the absolute value of the endogenous variable can be associated with a very large value of RMSPE. Second, although it is quite straightforward to calculate and use these summary statistics, it is not that straightforward to know how 'close to zero' is acceptable when one evaluates the tracking performance of a model. In the absence of an established statistical benchmark the acceptable magnitude of these summary measures has generally been determined by the system-builder's own experience. Model building, as Pindyck and Rubinfeld (1976) puts it, "is very much an art in learning to trade off alternative criteria in different ways" (p.320).

Model validation also possesses several serious problems which are more specific to the developing nations. Model building for the developing nations is still a very recent phenomenon and for some developing nations such as Tanzania it is almost non-existent. There is a host of other factors such as poor quality of data, frequent fluctuations in the main economic activities, and political instability which are generally difficult to be fully incorporated into the model.These summary measures should, then, be interpreted with these limitation in mind.

Using Theil's inequality coefficient and the RMSE criteria, the Tanzanian model of balance of payments appears to perform quite well over the simulation period. U-statistics are generally close to zero, ranging from as low as 0.01 for real income to as high as 0.60 for the rate of inflation (see table VI-1). Root mean square errors also appear to be generally low, indicating that the model has performed quite well in tracking the movements in the endogenous variables.

As evident from the decomposition of the source of forecast errors, the model performed fairly well in tracking movements in the treasury financing requirements, imports, international reserves, and the money supply. For these three endogenous variables, a major proportion of the forecast error(over 80 percent) appears to be due to the unsystematic component (the residual component). However, the model performed less accurately in explaining the historically observed values of the other endogenous varables. The systematic error component (errors due to the bias and the regression components) were found to be as large as 82 percent for real income and 63 percent for primary exports. The relatively poor performance of the model in explaining primary exports may be related to several factors such as the high level of aggregation, and more importantly, frequent changes in the climatic conditions and government agricultural policy which have not been fully incorporated into the model.

Judging performance on the basis of RMSPE the model also appears to perform quite reasonably in explaining the historically observed data. Except for the rate of inflation, RMSPE's are generally low, ranging from as low as 0.35 percent (imports) to as high as 1.68 percent (Treasury financing requirements) (see table VI-1). The relatively high RMSE for the rate of inflation, 0.28, should be interpreted with caution. As was pointed out earlier, RMSE is preferred to RMSPE for the variables expressed in terms of relative change, such as inflation. Furthermore, RMSPE dropped considerably by limiting the simulation period to 1966-1981 period.

The satisfactory performance of the model as suggested by the above three summary measures of forecast accuracy should be treated with a great deal of circumspection. As Klein and Young(1980) note, the system as a whole is not likely to drift away far from the sample experience for the within-sample simulation, if in the process of constructing the model one has searched diligently for the best-fitting equation for each variable. Under such circumstances, the least squares estimator picks up the set of single-equation estimates which minimizes $\Sigma(\hat{y}_t - Y_t)^2$ no matter what the extent of specification error is. The within-sample simulation benefits from this characteristic and predictive accuracy measures are not likely to discover the specification error. As such, these summary measures of forecast accuracy may give a very misleading indication of the true accuracy of the model.

B. Elasticity Multiplier Analysis

Multiplier analysis is concerned with the ability of the model to generate multipliers akin to those suggested by economic theory and past experience. Mulitipliers are important for two reasons. Firstly, if the model is acceptable as a valid reflection of the economic reality the multipliers may reveal many policy control properties of the model. The response of the model to changes in exogenous variables and in other policy variables are best measured by the multipliers.

The impact multipliers, $\partial y^i/\partial x^j$, measure the change in the ith endogenous variable, y^i, in period t resulting from per unit change in the value of the jth exogenous variable, x^j. Thus

$$\partial y^i/\partial x^j = \Pi^{ij}$$

where Π^{ij} is an element in row i, column j of the matrix Π in the reduced form equation VI-3. The elasticity impact multipliers for the Tanzanian model of balance of payments are shown in table VI-2.

Four important characteristics of the results in table VI-2 merit emphasis.

1. The primary export sector appeared to grow at a much smaller pace than the rest of the economy. The full capacity output multiplier was found to be as low as 0.37, indicating that with full capacity output growing at an average annual

Table VI-2. Elasticity Multipliers of a Monetary Model of the Balance of Payments of Tanzania.

Endogenous Variables	Pre-determined Variables																			
	PXP	PXP_{-1}	Y_{-1}	PX_{-1}	ZP	X	ZP_{-1}	Z_{-1}	MS_{-1}	MS_{-2}	DTS	Y^*	IDE	TFR_{-1}	NPX	NKI	IR_{-1}	DC_{-1}	DR	$\Delta\log(P)$
PX	.01	.03	.68	.90	.19	.17	-.10	-.16	.22	-.07	.07	.37	.10	.06	.21	.02	.0	-.07	.19	-.48
Z	.01	.0	.15	.05	-.38	.26	-.26	.25	.14	-.04	-.05	.24	.06	.03	.0	.01	.0	-.05	.12	-.31
PE	.01	.0	.18	.15	.20	-.18	.18	-.18	.35	-.07	-.08	.40	.11	.06	.23	.02	.0	-.08	.21	-.83
DC	.10	-.1	.56	-.34	-.56	.39	-.39	.38	-.39	-.03	-.04	4.21	.05	.03	-.51	.0	.0	-.03	-.51	1.24
TFR	.07	.0	2.23	-.5	-1.08	.65	-.65	.64	-.94	-.33	-.35	1.77	.50	.29	-.87	.08	-.01	-.36	-.92	2.24
Y	.02	.0	.19	.17	.23	-.20	.20	-.19	.26	-.08	-.08	.44	.12	.07	.25	.02	.0	-.08	.23	-.81
AE	.01	.0	.28	.10	.10	-.11	.11	-.11	.26	-.08	-.09	.44	.12	.07	.14	.02	.0	-.08	.22	-.53
IR	3.01	.0	-3.40	2.3	-4.5	-2.6	-2.6	-2.6	-.50	.16	.17	-.85	-.24	-.14	2.64	3.81	1.22	.17	-.44	1.08
MS	.17	-.44	.39	-.23	-.78	.26	-.26	.25	.44	-.03	-.03	4.15	.04	.02	-.38	.20	-.03	-.84	-.53	1.29
$\Delta\log(P)$	.03	.0	1.09	-.23	-.53	.32	-.33	.33	-.24	-.16	-.17	.87	-.13	.07	-.42	.04	.0	-.18	-.45	1.10

PX.	Primary exports.
Z.	Imports.
PE.	Private expenditure.
DC.	Domestic credit.
TFR.	Treasury financing requirements.
Y.	Real income.
AE.	Aggregate expenditure.
IR.	International reserves.
MS.	Money supply.
$\Delta\log(P)$.	Inflation rate.
XP.	Primary export prices.
ZP.	Import prices.
DTS.	Growth rate of the actual supply of goods.
Y^*.	Full capacity output.
IDE.	Implicit fiscal deficit.
NPX.	Non-primary exports.
NKI.	Net capital inflow.
DR.	Government domestic revenue.

rate of 10 percent the primary export sector grows only at 3.7 percent. Whatever might be the reasons underlying such an inelastic response of primary export sector to the growth of the long-run full capacity output(Y^*) its implication for the country's balance of payments is quite clear. As seen from tableVI-2, both primary exports and imports are quite inelastic with respect to long-run full capacity ouput; 0.37 for primary exports and 0.24 for imports. The elasticity multiplier for imports appear to be quite small for a developing economy, such as the Tanzanian economy, which relies heavily on the importation of industrial intermediate and capital goods especially in its early stage of development. The relativly small size of the elasticity multiplier for imports might be due to the foreign exchange control measures which severely checked flows of imports to Tanzania during the period under study (see chapter III).

Furthermore, international reserves are inelastic to the changes in long-run full capacity output. A one percent increase in the full capacity output tends, *ceteris paribus*, to lower international reserves by about 0.8 percent. This does not seem to be unrealistic, considering the growing trade deficits over the period under study.

These results indicate that there is a clear trade off between economic growth and a better balance of payments. These results also suggest that as long as primary exports continue to dominate Tanzanian exports to the rest of the world, policies directed at increasing the the economy's capacity to produce exports are in the right direction.

2. The response of aggregate private expenditures to the monetary variables appear to be greater when both direct and indirect effects of a change in the monetary variables are taken into account. In contrast to the structural parameter estimates of the expenditure equation which measure only the direct effect of a change in the one-period lagged money supply on the expenditure, the corresponding parameter estimates in the reduced form of the expenditure measure both the direct and indirect effects. As seen from table VI-2, the lagged money supply elasticity multiplier and lagged inflation elasticity multiplier for the private aggregate expenditures are 0.3, and 0.84 respectively which are at least twice as large as the corresponding values given by the private expenditure equation V-5. These results suggest that the monetary variables play a more significant role in the process of private expenditure adjustment and balance of payments adjustment than simply indicated by the structural parameter estimates of these variables.

3. Both domestic credit and treasury financing requirements appear to be quite elastic with respect to the rate of inflation lagged one period. A 10 percent increase in the current rate of inflation, *ceteris paribus*, would increase the domestic credit and treasury financing requirements by as much as 12 and 13 percent respectively in the following year. These results support Aghevli and Khan(1978)'hypothesis that there is a two-way relationship

between the expansion in liquidity and the rate of inflation. An increase in the rate of inflation tends to widen the fiscal deficits as the government attempts to maintain its expenditures constant while tax revenues are lagging behind. An increase in fiscal deficits, in turn, increases the money supply as a relatively large proportion of treasury financing requirements are monetized by the central bank.

4. As can be seen from table VI-2 treasury financing requirements are quite elastic with respect long-run full capacity output(Y^*). A 10 percent increase in Y^*, *ceteris paribus*, increases treasury financing requirements by as much as 17.7 percent. This is not surprising considering the rapid expansion of the public sector in Tanzania over the period under study. The growing size of the public sector, however, may raise some concerns especially in relation to the efficiency of the public sector versus the private sector, and more importantly in relation to the composition of government expenditures. As our descriptive examination of the government expenditure and its composition indicated, government expenditures appeared to be biased in favor of the development of the service sector, especially public administration (see chapter II). Government expenditures were generally less favorable toward the development of the productive capacity of agriculture and thereby the economy's capacity to produce exports.

C. Policy Simulation of the Model

Once the model is accepted as a reasonable reflection of the Tanzanian economy it can be used to explore the consequences of changes in the exogenous variables and in other policy variables on the behavior of the key macroeconomic variables of the model. This section undertakes a series of simulation experiments to determine the way in which the model responds to various policy shocks. For this purpose two alternative simulation experiments have been run;

i)a 10 percent change in a policy variable or any other exogenous variables concerned for each year over the simulation period; and

ii)10 percent change for the period 1974-75.

Alternative (i) considers the impact of a given percentage change which is maintained throughout the simulation period, while alternative (ii) considers the impact of a given percentage change for just the period 1974-75. The period 1974-75 was chosen mainly to see whether the simulation results throw any light on the nature of the controversy surrounding the government's balance of payments stabilization program at the time of the balance of payments crisis of 1974-75.

The policy configurations are:

(I). Producer prices for the primary export crops grow at an annual rate equal to the average annual rate of inflation over the sample period;

(II). The rate of growth for net capital inflows is assumed to be 10 percent higher than the actual growth rates.

(III). The exchange rate is 10 percent below its value over the sample period;

(IV). The government deficit is assumed to be 10 percent lower than its actual values throughout the simulation period; and

(V). Fiscal deficits, exchange rates, and net capital inflows are 10 percent lower than their historically observed values over the period 1974-75.

Policy simulation I assumes that the government has succeeded in raising producers' prices of primary products, perhaps by increasing the efficiency of crop marketing boards or crop authorities. The marketing and administration costs of the crop authorities absorbed an ever growing portion of the the world market prices of the primary products, leaving the direct producers with a shrinking portion of the world market price (see chapter III).

Policy simulations II and III represent a foreign borrowing management policy and an exchange rate variation policy respectively. Policy II assumes that the government has succeeded in attracting 10 percent more foreign capital inflow than the actual capital inflow over the simulation period. According to policy simulation III, the exchange rate is assumed to be 10 percent lower than its historically observed value over the simulation period.

Policy simulation IV represents a contractionary fiscal policy which assumes a 10 percent reduction in the growth rate of the total deficit over the sample period. The reduction in fiscal deficit is assumed to be achieved by lowering the implicit deficit, defined as the difference between the trend level of domestic revenue and the allowable expenditures (see chapter IV). To reduce the total fiscal deficit by 10 percent the implicit deficit was lowered by 16 perent since the implicit deficit accounted for about 62 percent of the total fiscal deficit over the sample period.

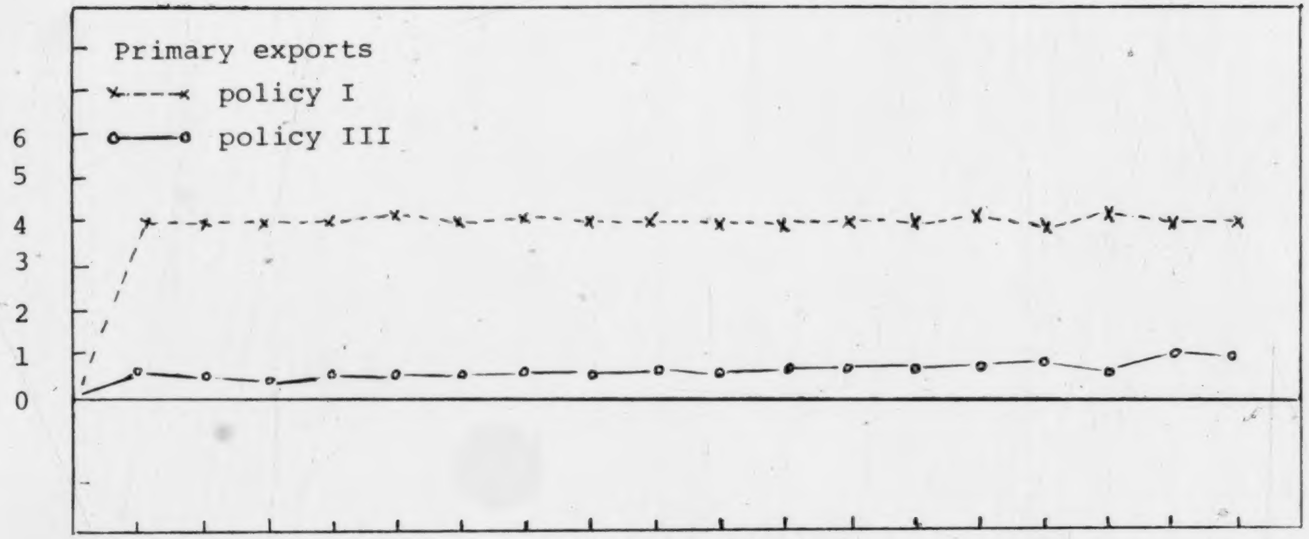
Policy simulation V represents a policy mix consisting of a fiscal policy, exchange rate policy, and a foreign borrowing management policy. According to this policy mix the government's balance of payments stabilization program relies heavily on a demand management policy and an exchange rate policy rather than on foreign borrowing. During the balance of payments crisis of 1974-75 the government's stabilization program relied heavily on the foreign borrowing to close the gap between domestic expenditures and income. To facilitate the comparison between these two contrasting policies policy simulation V set the net capital inflows for the period 1974-75 equal to the annual average capital inflows over the period 1970-74. Keeping net capital inflows constant policy simulation V explores the consequences of a 10 percent simultaneous reduction in the fiscal deficit and exchange rate on the key macroeconomic variables of the model.

Before analysing the policy simulation results the following section outlines the important simulation procedures used in carrying out the experimental simulations.

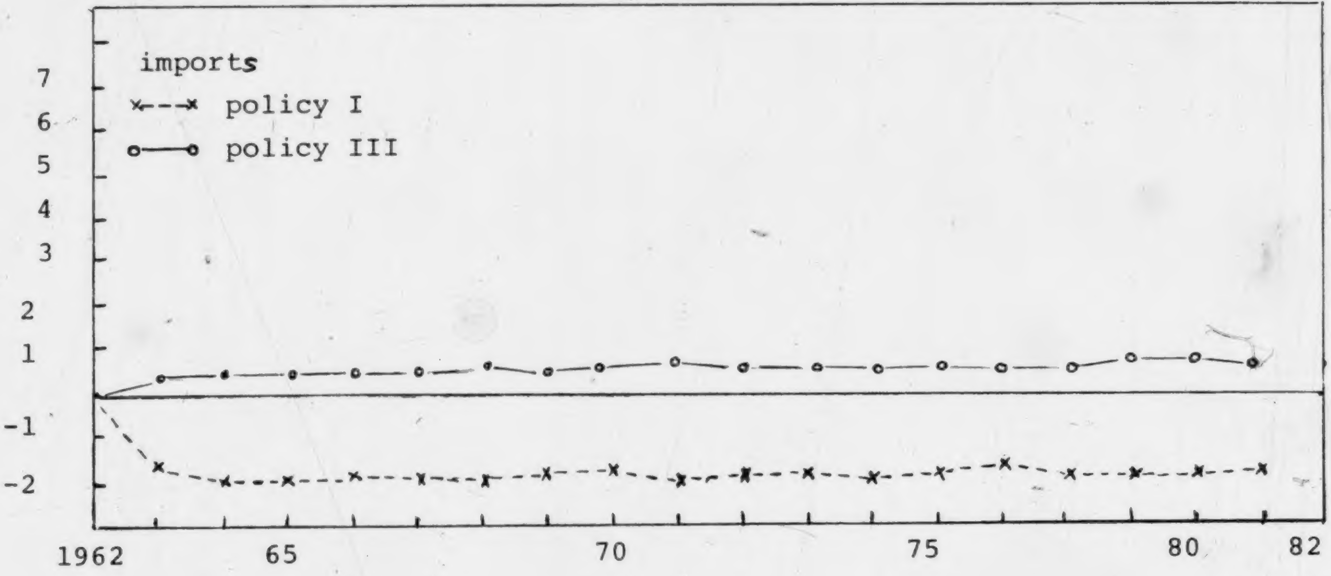
1. The structure of the model as specified and estimated in tables IV-1 and V-1 is assumed to a reasonable reflection of the Tanzanian economy.
2. The policy simulations presented in this section are all non-stochastic. In solving the reduced form system VI-3 for changes in policy variables, residuals were set to zero.
3. In all policy simulations, only an explicitly indicated change in policy instrument was examined and the values for the other exogenous variables were held fixed at their base simulation.
4. While simulation results were obtained for all endogenous variables under the five policy configurations, only those pertaining to the balance of payments (primary exports, import and the international resreves), real income, money supply, and the inflation rate are reported.
5. For each simulation the base simulation was used as the point of comparison.
6. For each simulation the results are presented as the percentage deviation of the policy simulated values from their base simulated values.

The simulation results fo the five policy scenarios are suumarized in Figures VI-11 through VI-30.

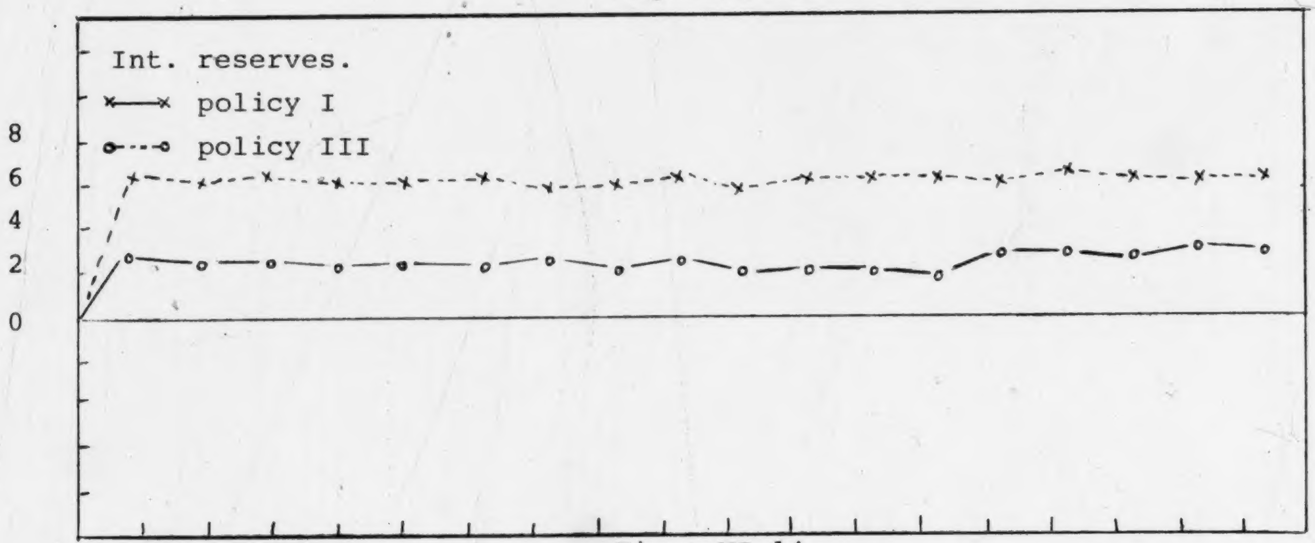
FigureVI-11



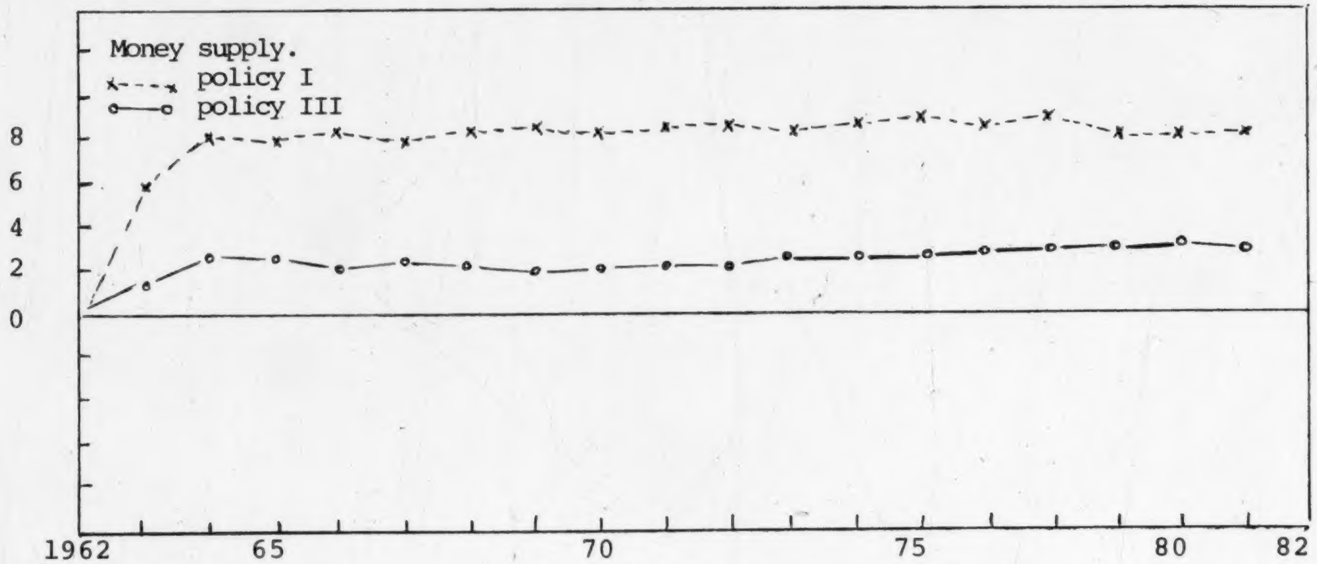
FigureVI-12



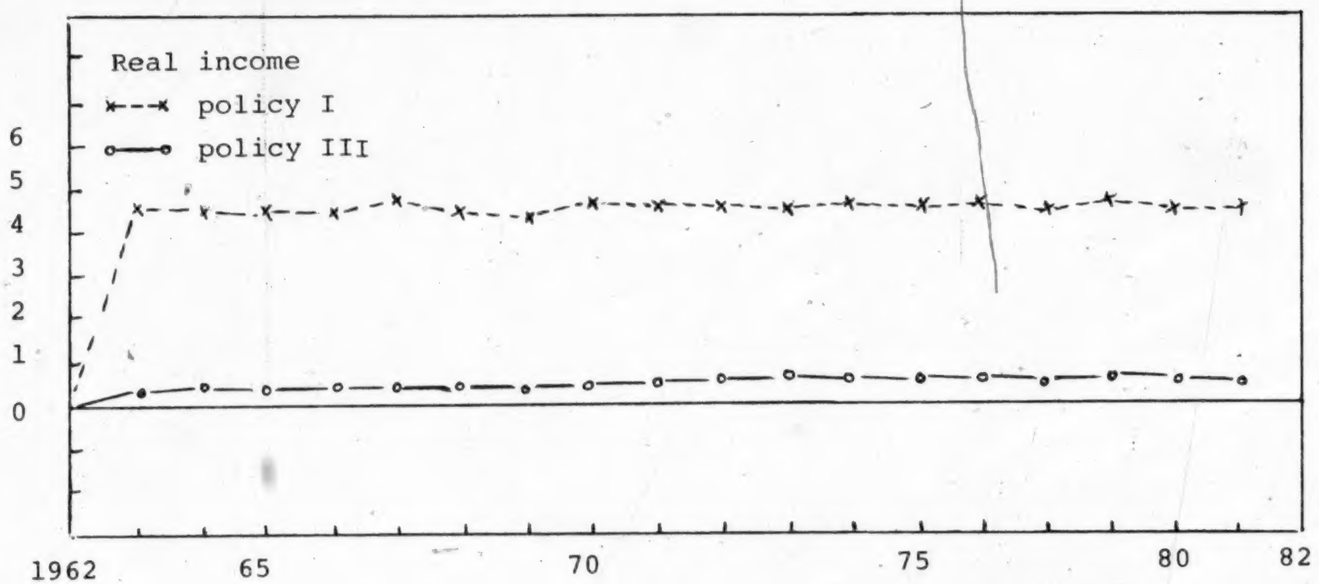
FigureVI-13.



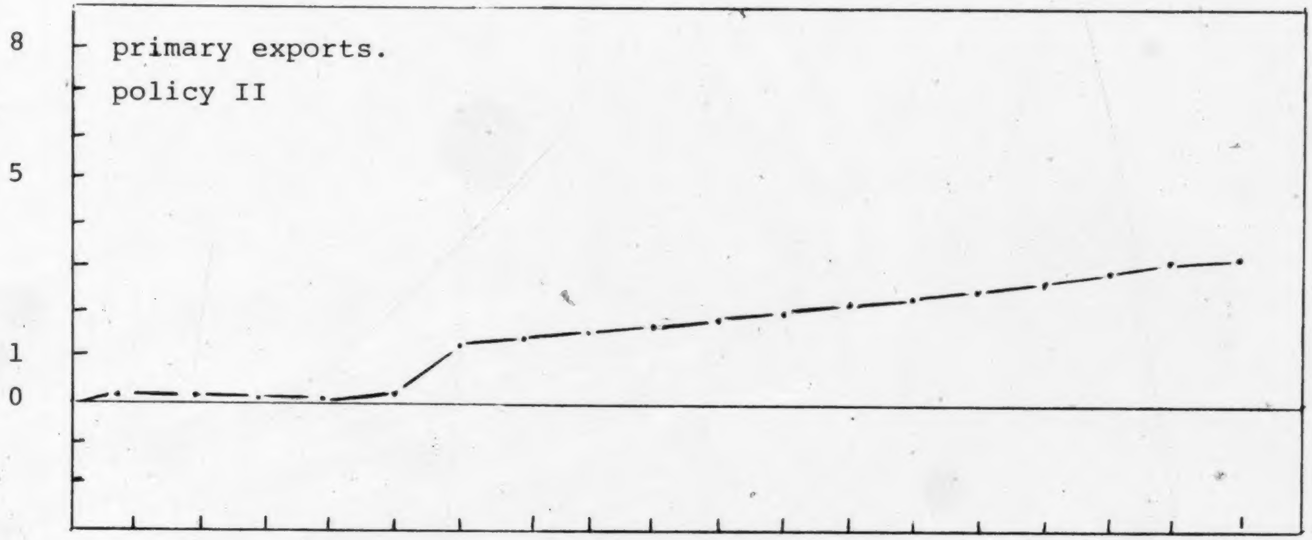
FigureVI-14.



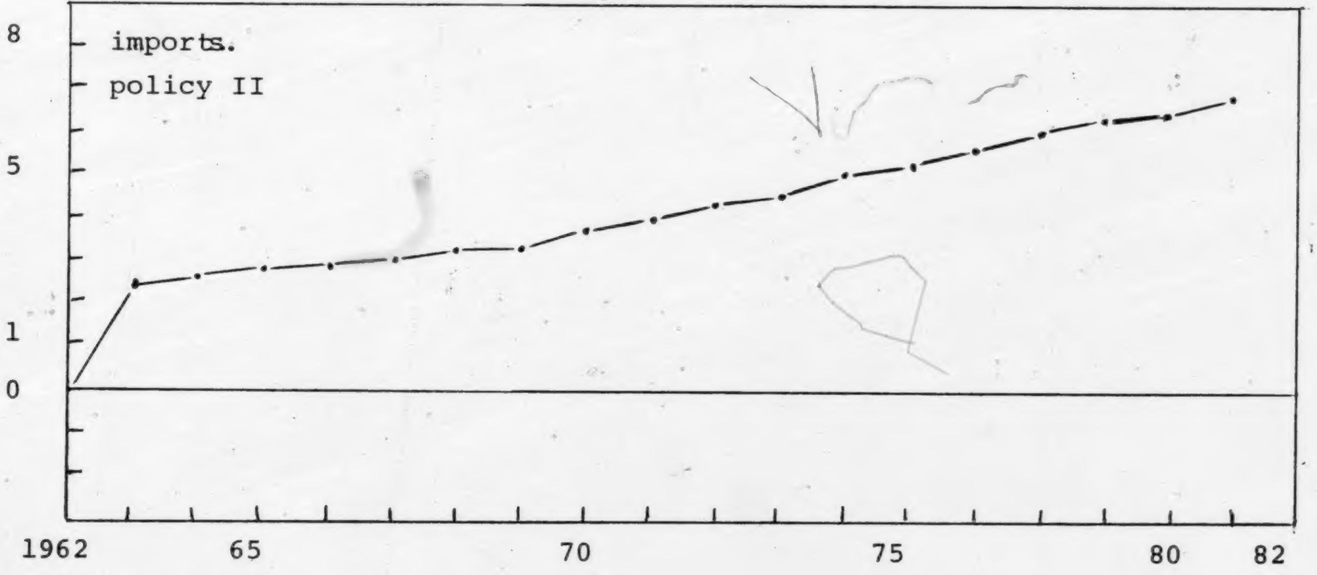
FigureVI-15.



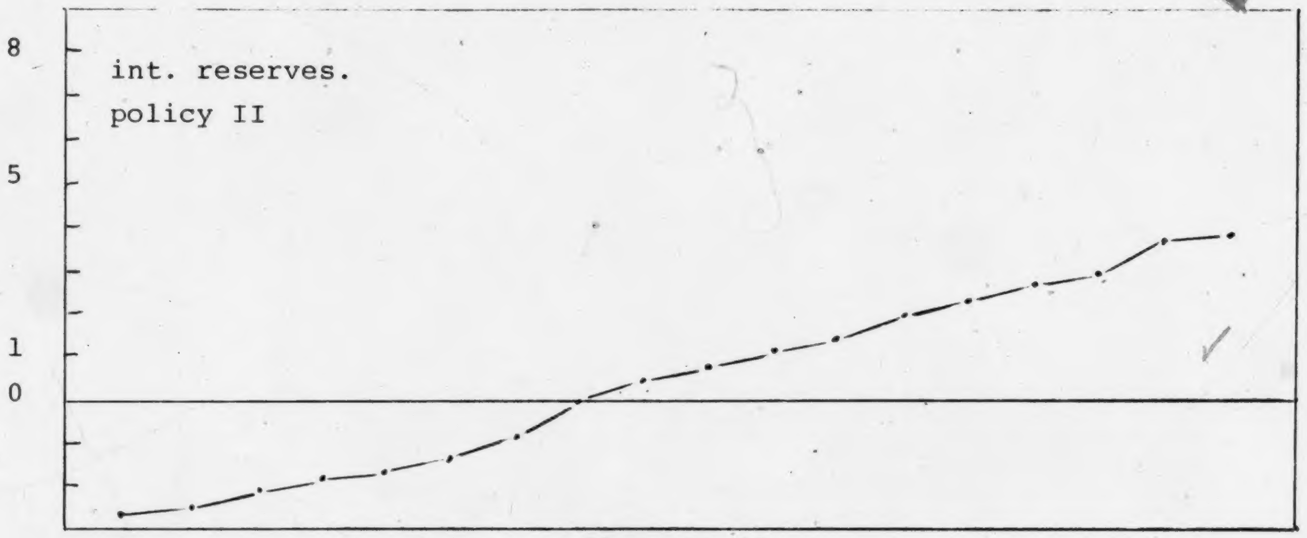
FigureVI-16.



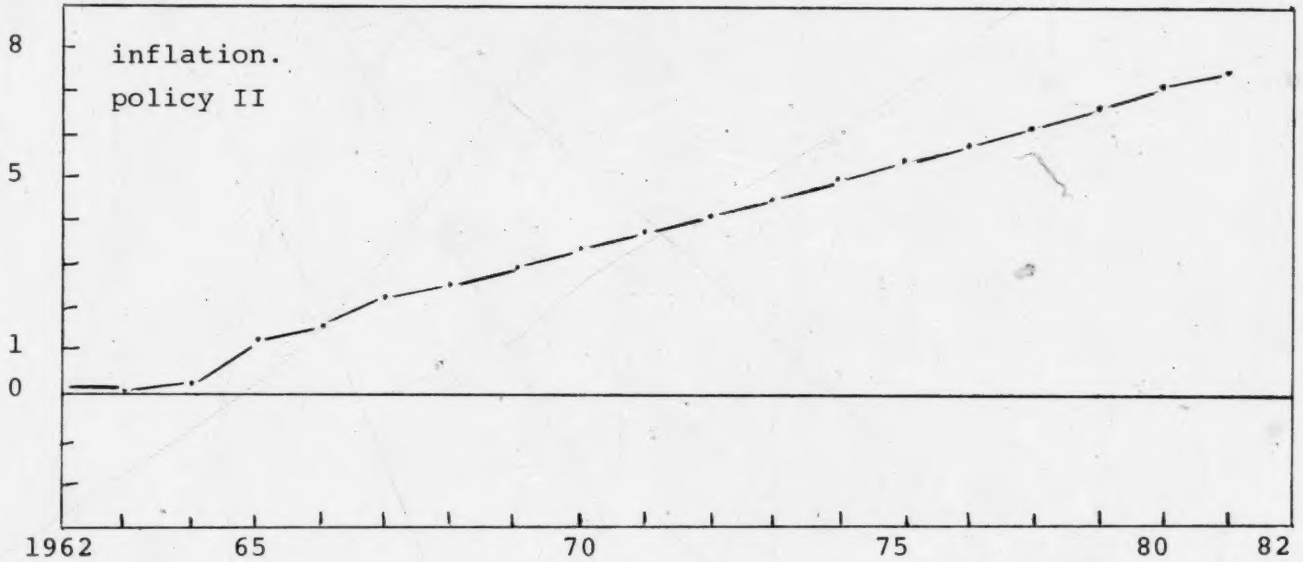
FigureVI-17.



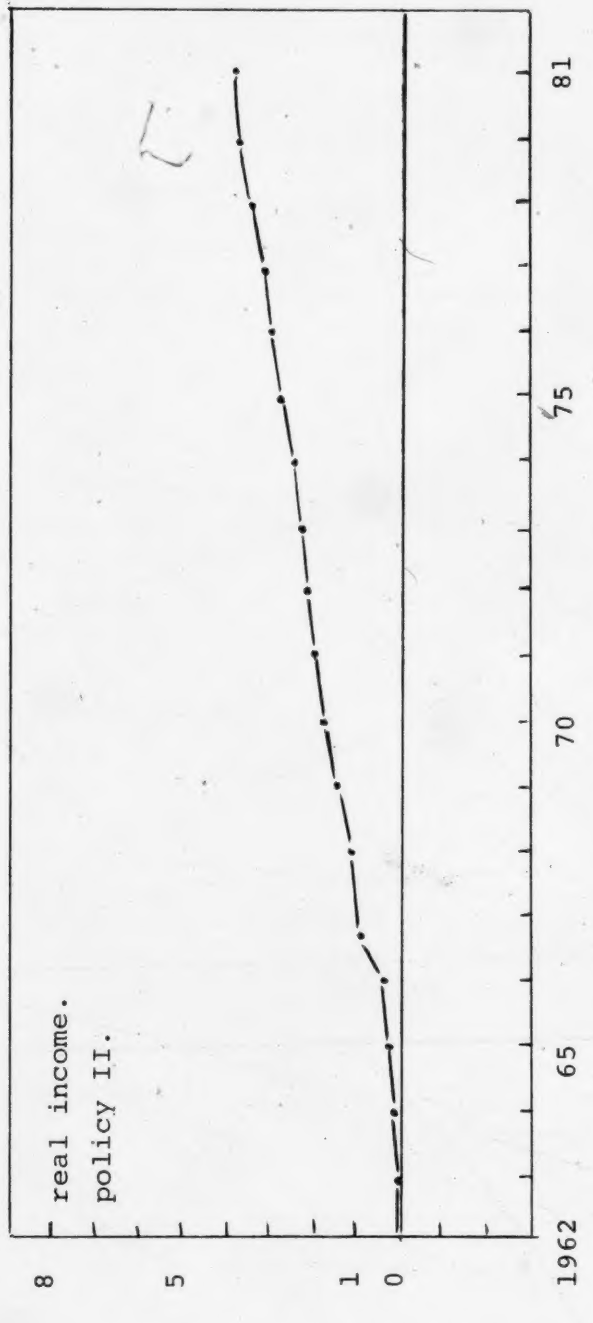
FigureVI-18.



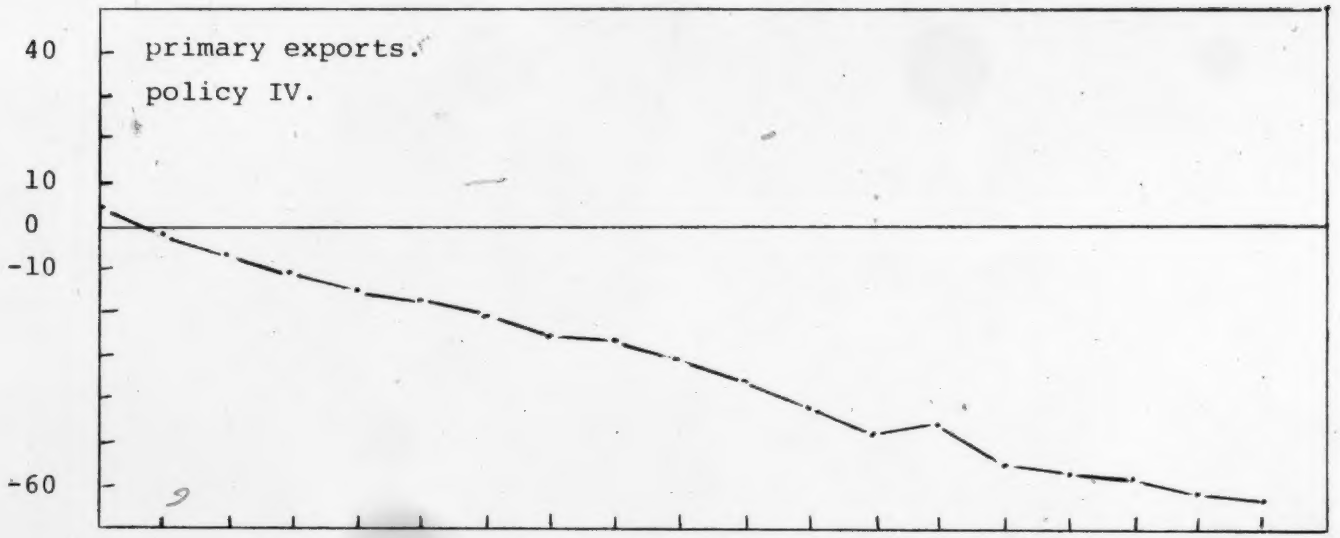
FigureVI-19.



FigureVI·20.



FigureVI-21.



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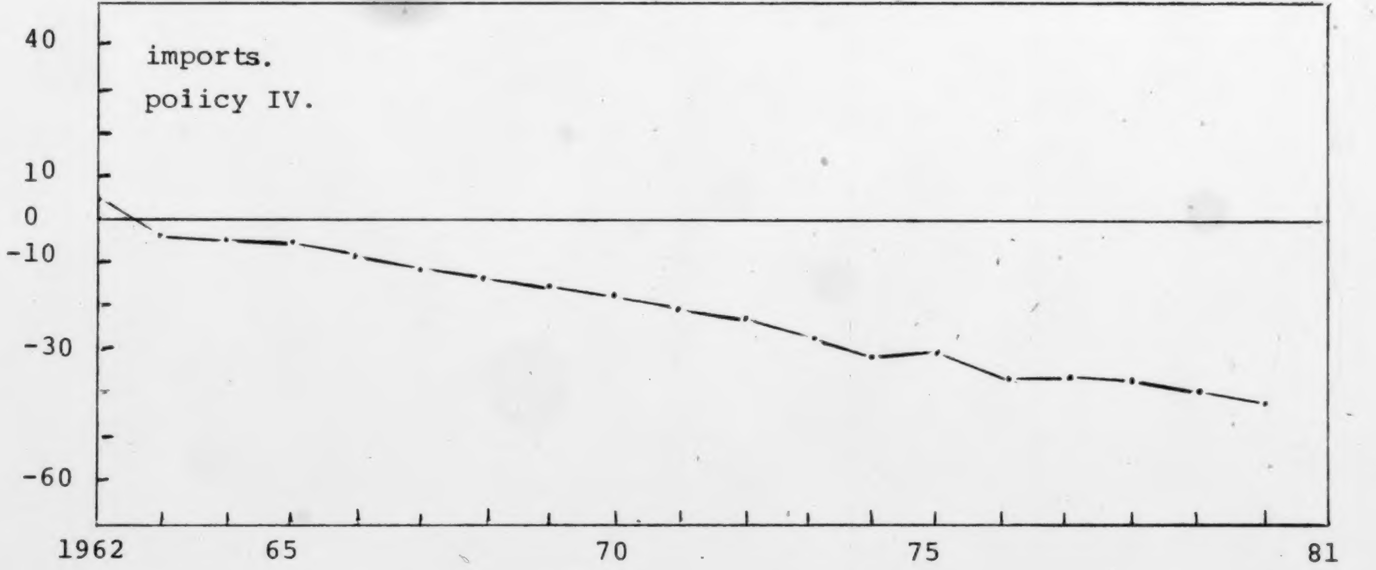
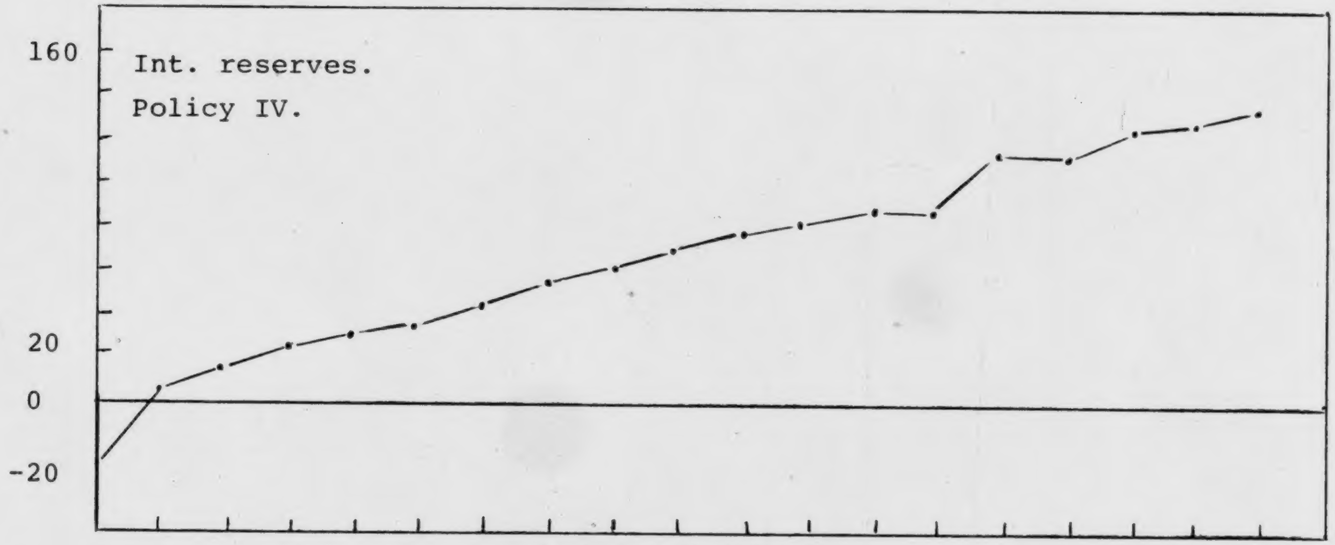
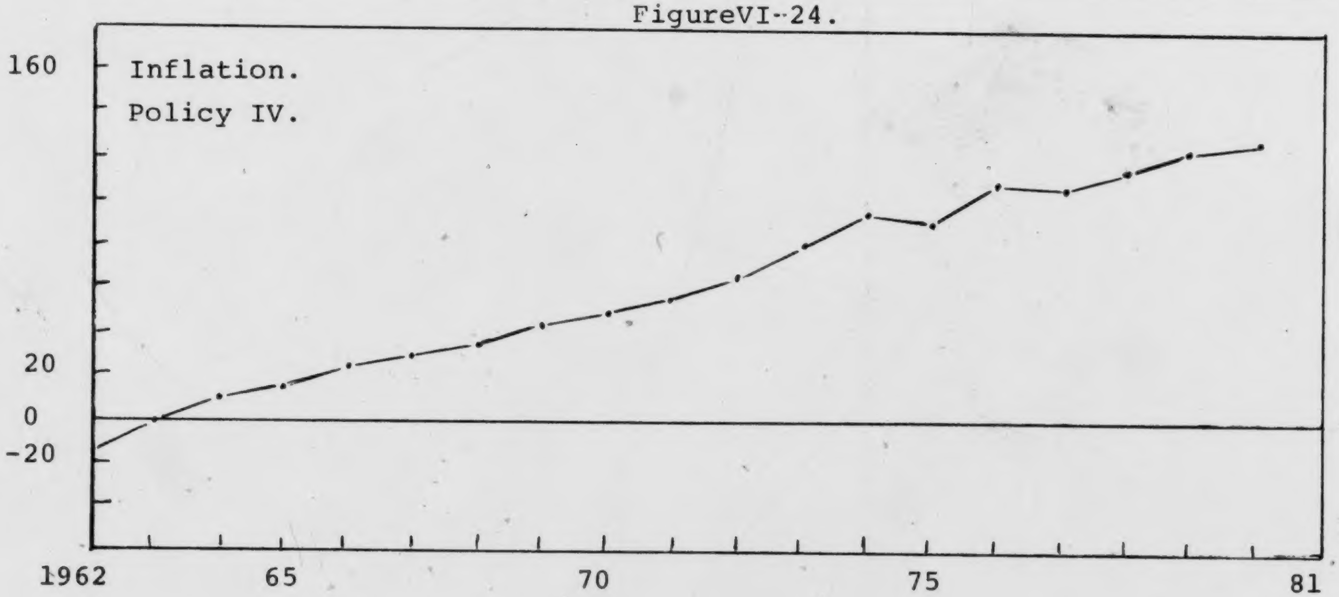


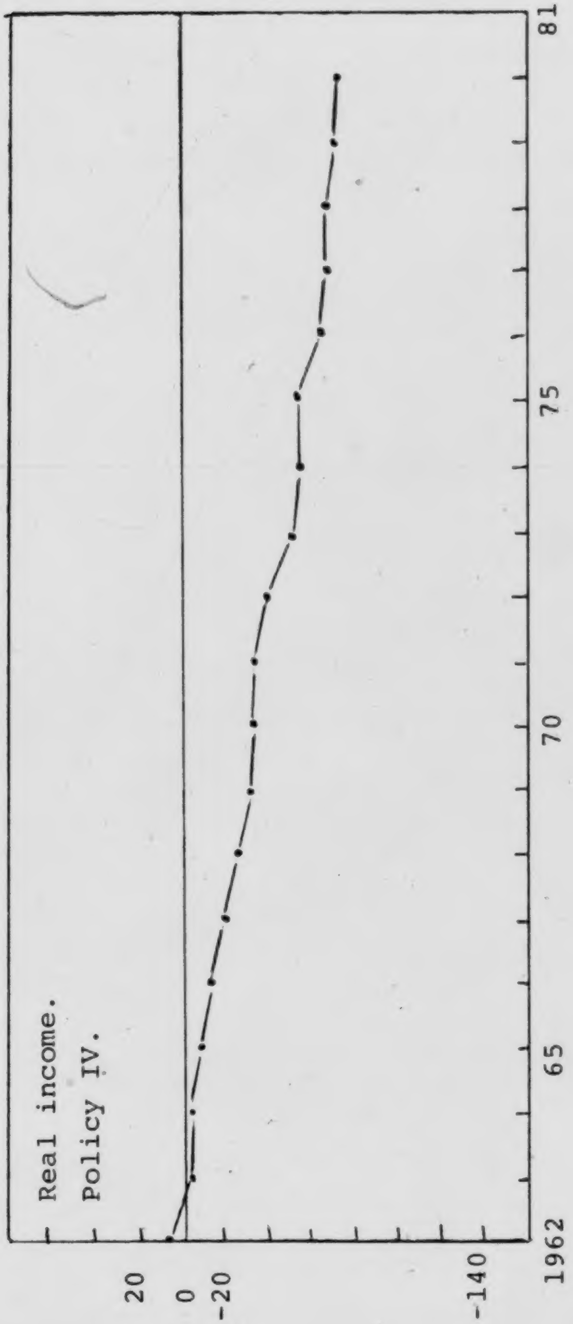
FigureVI-23.



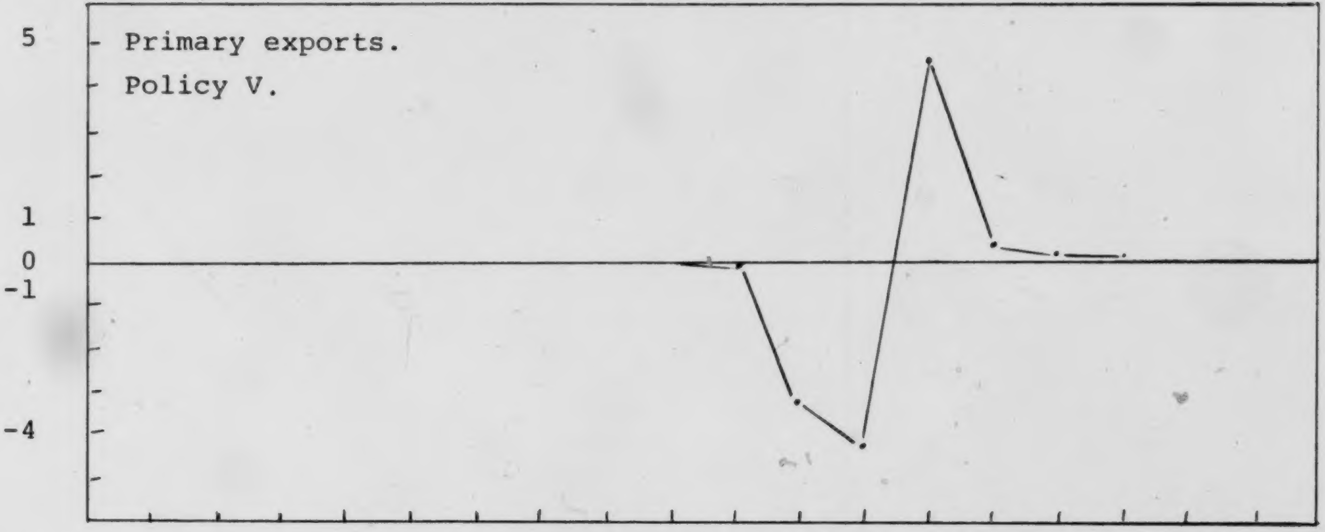
FigureVI-24.



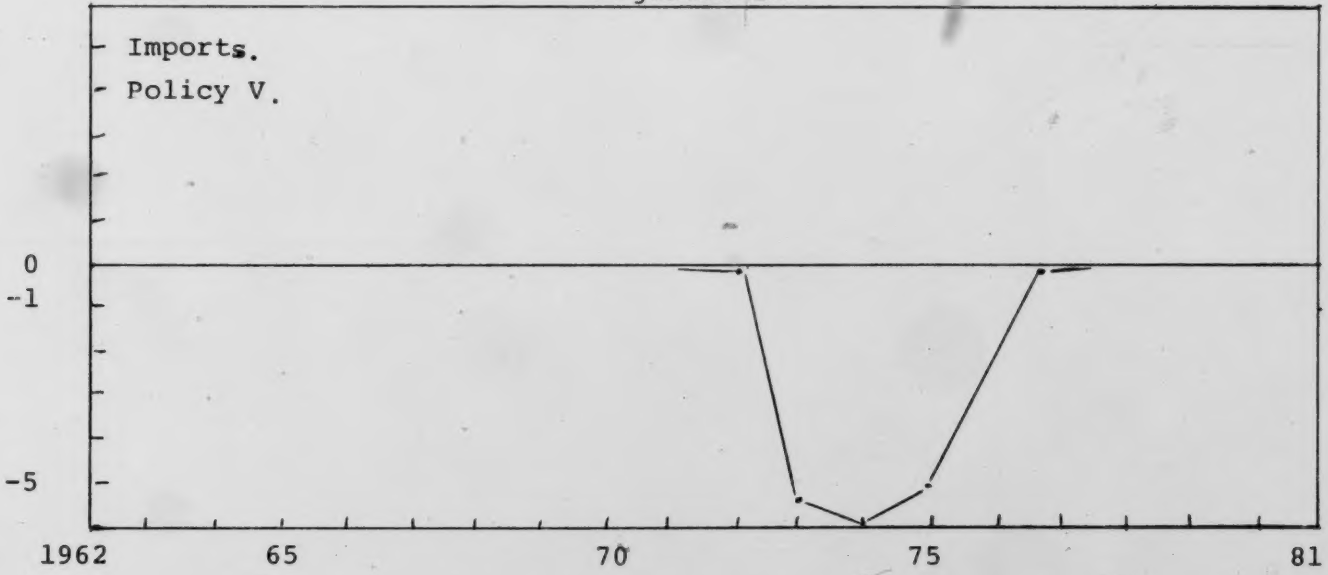
FigureVI-25.



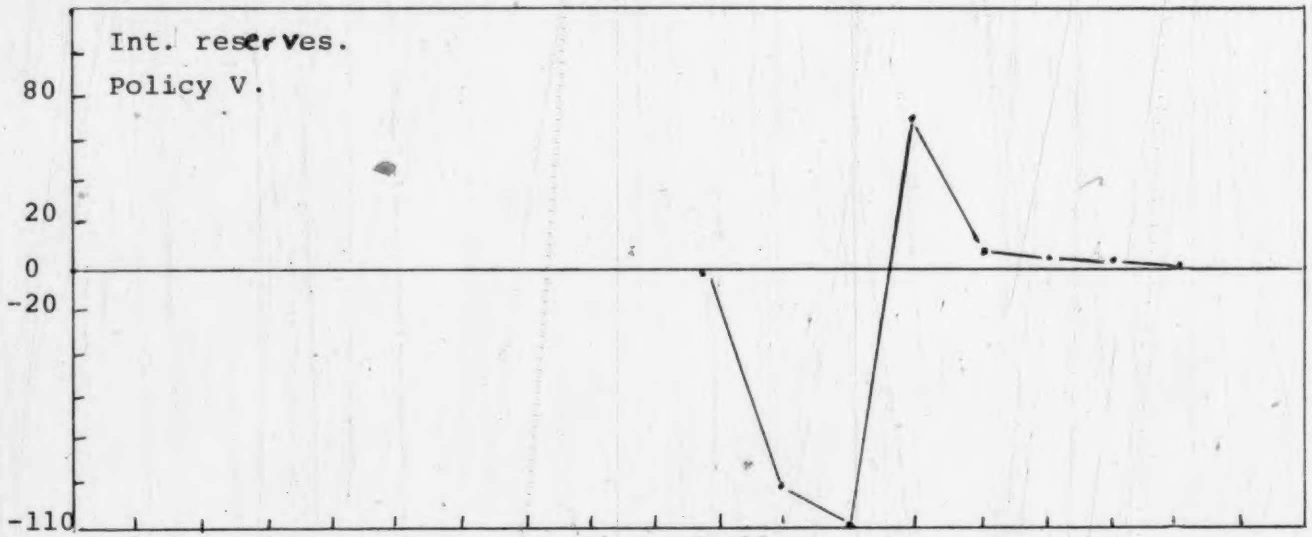
FigureVI-26



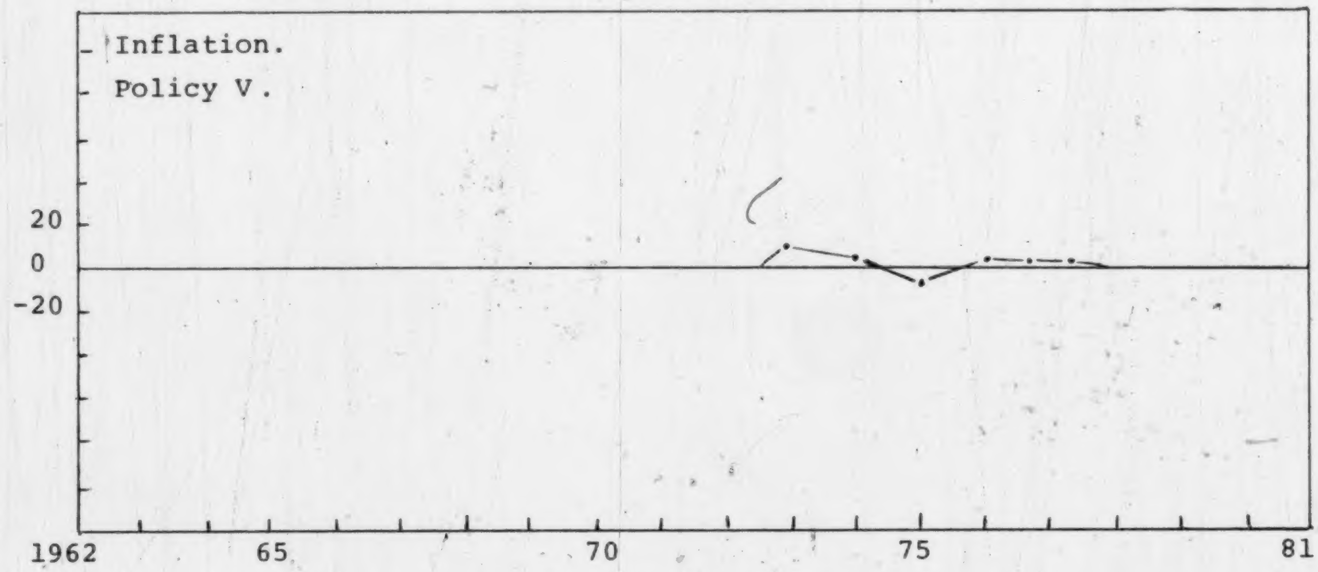
FigureVI-27.



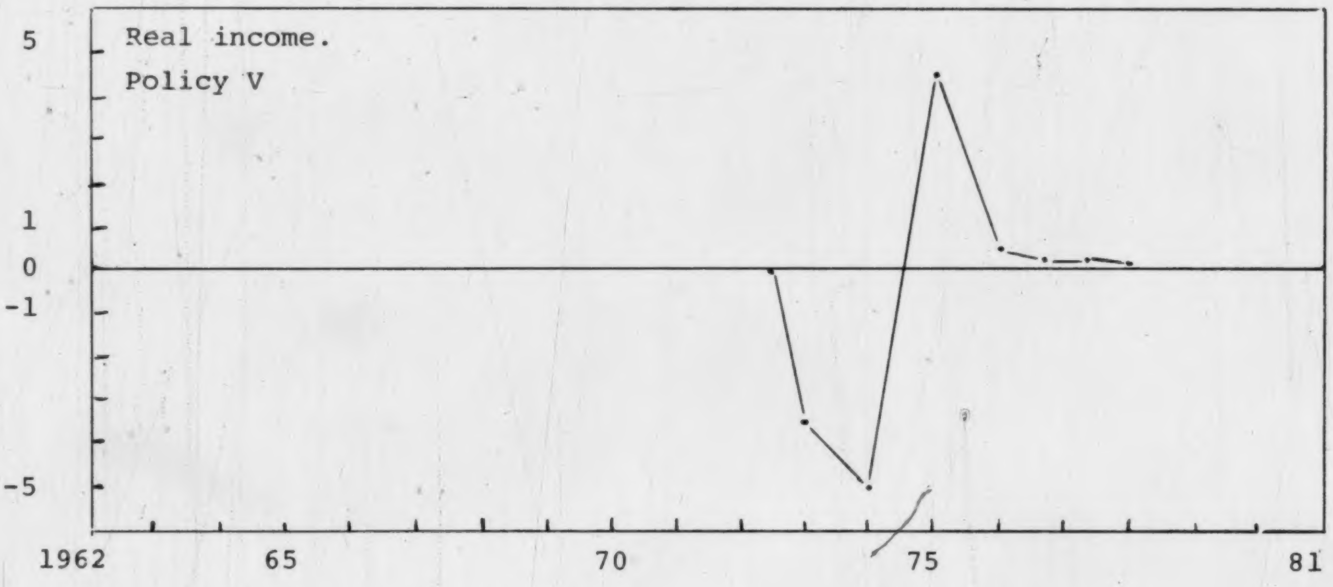
FigureVI-28



FigureVI-29.



FigureVI-30



Policy simulation results are very rich. To avoid a lengthy examination of the results of five policy simulations for five key macroeconomic variables, the following section discusses only major characteristics of the results and their implications, if any, for the balance of payments stabilization program.

1. Both price and output variables appeared to play a more significant role in the balance of payments adjustment process than indicated by the size of the price and output elasticities of the primary export supply and demand for imports. The simulation results showed that both policy shocks I(an increase in the price of export crops) and III(a devaluation) led to an increase in exports, real income, net international reserves, and in the price level(see figures VI-11 through VI-16). However, devaluation of the Shilling was found to be more effective in raising net international reserves than policy simulation I. This difference in the degree of effectiveness may be related to the real cash balance effects of the devaluation on private expenditure and on imports. The increase in prices resulting from the devaluation reduces real cash balances held by the public and thereby lowers aggregate private expenditures and imports (see equations IV-1 and IV-8). As simulation results indicate, imports decline under policy simulation I but rise under simulation policy III. The decline in imports under policy shock III (devaluation) indicates that the price and real cash balance effects of devaluation on the demand for

imports dominate the real income effect and the foreign exchange restriction effect.[27]

These results suggest that it would be inadequate to evaluate the impact of an exchange rate variation on the Tanzanian balance of payments just on the basis of price elasticities of exports and imports. Real balances play a considerable role in the process of balance of payments adjustment and they should be incorporated in any serious evaluation of the exchange rate variation policy. These results are consistent with the monetary approach to the balance of payments.

2. An increase in the level of net foreign capital inflows appeared to increase imports and the net foreign assets of the central bank, but it had a negligible effect on exports and real income (see figures VI-16 through VI-20). These results should be interpreted with care. Policy simulation II does not consider the impact of net capital inflows on log-run full capacity output. Since long-run full capacity output is here treated as an exogenous variable policy simulation II only considers the impact of the foreign capital inflows on actual real income. Thus, the simulation results may give a less accurate picture of the full impact of capital inflows on the key macroeconomic variables, at

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[27] The demand for imports is hypothesised to vary negatively with import prices and positively with the level of real expenditures and the foreign exchange restrictions as proxied by export earnings. To the extent to which devaluation improves export earnings, it leads to a reduction in foreign exchange restrictions and thereby to a higher level of imports.

least to the extent that net capital inflows foster domestic capital formation and the growth of long-run full capacity output.

3. A demand management policy and exchange rate policy appear to be relatively effective in increasing real income and international reserves. A simultaneous decrease in the fiscal deficit and a devaluation of the Tanzanian Shilling lowered exports and net foreign assets of the central bank during the first two years of the simulation, but increased them during subsequent years(see figures VI-26 through VI-30). In contrast, imports and prices showed a steady decline and rise respectively over the simulation period. It should be mentioned that policy simulations III and V most likely underestimate the full impact of a devaluation on primary exports and imports. These two policy simulations measure only the response of exports to changes in current and one-period lagged prices, while a major proportion of the export response is expected to occur in a much longer period.[28] The simulation results for imports should also be interpreted with caution, at least to the extent that policy simulation V underestimates changes in imports resulting from an increase in export earnings and thereby a reduction in foreign exchange restrictions.

Even with the shortcomings of the simulation results, they shed some light on the content of a balance of payments stabilization program. In contrast to the views held by the Tanzanian policy makers and shared by some economists at the time of balance of payments crisis of 1974-75, demand management and exchange rate policies seem to be effective in improving the balance of payments. The cost of the program, as measured by the lower rate of growth for real income and a higher rate of inflation, appear to be short-lived. Furthermore, an increase in net foreign capital may reduce the cost of adjustment, but as the simulation results for policy shocks II, III, and V indicate, an increase in net capital inflows is not a substitute for a demand management and exchange rate variation policy.

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[28] As is evident from the parameter estimates of the export equation V-2, the long-run price elasticity of the primary exports is three times larger than its short-run elasticity, and the adjustment mean lag is about 4 years.

4. A contractionary fiscal policy appears to decrease exports, imports, and real income, but increase net foreign assets held by the central bank(see figures VI-21 through VI-25). The decline in real income was more rapid in the 1960's than in the 1970's, indicating the relatively large size of the fiscal deficits during the later period. The treatment of the deflationary fiscal policy under the policy shock IV also warrants comment. The money supply is here treated as an endogenous variable whose behavior is explained by the changes in the net domestic and foreign assets of the central bank. Given the counter-cyclical character of the monetary policy, as indicated by the central bank reaction function, the full impact of a reduction in the fiscal deficit on the economy is not most likely realized. In fact, as is evident from table VI-2, a

10 percent reduction in the implicit deficit reduces the money supply only by 4 percent. As such the simulation results show the net effect of the two counteracting fiscal and monetary policies.

In interpreting the simulation results for policy shock IV it should also be noted that the simulation results are subject to the same shortcomings as they were under the policy shock II. The simulation results do not consider the impact of a decline in the fiscal deficit on full capacity output. If fixed capital formation is related to real government expenditures, as it has been agrued by Von Furstenberg(1980), a contractionary fiscal policy will, then, affect the rate of growth of full capacity output. Under such circumstances, the simulation results may provide a less accurate picture of the true impact of policy shock V on the key macroeconomic variables.

D. Summary

The purpose of this chapter has been to examine the economic and statistical properties of the entire model of tableIV-1. This was achieved by using the two commonly known methods of model validaton; goodnees-of-fit and elasticity multiplier analysis. The model was also subject to several policy shocks to explore the consequences of changes in exogenous variables and in other policy variables on the key macroeconomic variables of the model.

The simulation results indicated that the model performed quite well in tracking the movements in the endogenous variables of the model. Most of the turning points were picked up quite well over the simulation period.

The performance of the model was also evaluated by using several statistical summary measures of predictive accuracy, such as root mean square error, mean square percentage error, and the Theil inequality coefficient. Except for the rate of inflation, all three summary measures were quite low, indicating that the model was a fairly accurate representation of the Tanzanian economy over the period under study. With regard to inflation, model performance showed considerable improvements when the simulation period was restricted to the 1966-1981 period.

Elasticity multipliers were derived by solving the reduced form of the estimated model of table V-1. The results suggested that there is a trade off between economic growth and a better balance of payments. The elasticity multiplier for primary exports and international reserves with respect to long-run full capacity output were 0.37 and 0.8 repectively. The results also suggested that there is a two-way relationship between the expansion in liquidity and the rate of inflation. An increase in the rate inflaton tends to widen fiscal imbalances thereby increasing domestic credit through the monetization of the treasury financing requirements by the central bank. Finally, monetary variables appeared to play a more significant role in the adjustment of expenditures and imports than suggested by their corresponding structural parameters.

Policy simulations conveyed interesting information. A stabilization program consisting of an exchange rate policy and demand management appeared to affect the balance of payments and real income. An increase in net capital inflows had a negligible effect on primary exports and real income, and a devaluation of currency appeared to be more effective in improving the balance of payments than an agricultural pricing policy which only increased primary export prices.

VII. SUMMARY AND CONCLUSIONS

The purpose of this study was to formulate and estimate a short-run macroconomic model of the Tanzanian balance of payments. This was achieved by taking the following steps:

i) The first part of the study described the main features of the Tanzanian economy, its performance, and the government policies implemented over the post independence period 1962-1981.

ii) The second part of the study extended the long-run standard reserve-flow equation of the monetary approach to the balance of payments by formulating and estimating a short-run 14-equation simultaneous system.

iii) The third part of the study carried out several simulation experiments to explore the consequences of chnages in exogenous variables and in other variables on the key endogenous varaibles of the model.

In reviewing the literature on balance of payments theory and its application to developing countries, three main problems areas were identified:

1. Methodological and statistical problems

The standard reserve-flows equation is considered to be nothing more than a demand-for-money equation combined with an identity, and as such its coeffcients can not help at all to discriminate between monetary and non-monetary approaches to the balance of payments. Furthermore, ordinary least squares estimates of the coefficient on the domestic credit variable (offset coefficient) is biased due to simultaneity problems.

2. Credit creation and the government budget constraint

The assumption that variations in domestic credit are independent of the changes in international reserve flows appears to be too rigid especially in the context of developing economies. This treatment of domestic credit abstracts from all the main operational problems facing the monetary authority in achieving any desired level for the monetary base. This is more so in developing countries where (a)the market for government securities is not well developed and the government relies heavily on the central bank to finance its deficits; (b)the foreign sector provides a relatively large proportion of government revenues as well as most of the industrial intermediate and capital goods utilized in the production of domestic output; and (c)the government's budgetary position is generally more susceptible to fluctuations in the country's balance of payments.

3. Rigid assumptions

In the long-run equilibrium analysis of the monetary approach to the balance of payments, monetary aspects are generally regarded as the core and essence of the mechanism in the process of adjustment. 'Real' factors are excluded. Moreover, the monetary approach to the balance of payments concentrates on the long-run consequences of policy and parameteric changes on the behavior of the balance of payments, and takes an eclectic view of the process of adjustment through which these long-run consequences come about. Little work has been done to marry the monetary and Keynesian approaches to the balance of payments in a way relevant to the short-run context which is characterized by both variations in production and employment, and with which policy makers are concerned.

In chapter III we described and analysed some of the main structural features of the Tanzanian economy and policy implemented over the period 1962-1981, with special reference to the country's balance of payments and fiscal and monetary structures.

Throughout the 1960s, Tanzania enjoyed relatively rapid economic growth with little changes in prices. During this period, both the monetary and fiscal authorities had little influence on the money supply and financial resources of the banking system. The money supply was mainly determined by the country's balance of payments, and the power of the fiscal authorities was checked by their limited accessibility to financial resources of the banking system, a narrow domestic tax base, and by bottlenecks in Tanzania's infrastructure.

A sharp break, however, came during the First and Second Five Year Development Plans (1969-1981) which led to large government deficits, a considerable part of which had to be financed by the banking system. The monetary policy of the Bank of Tanzania, and of the government which controlled it to an increasing extent was directed primarily at reaching the overly-ambitious goals set by the plans. The result of the change in policy was a drastic increase in the Bank's net claims on the government, depletion of Tanzania's meager foreign reserves, and rapid growth in the money supply and prices. During this period the economy was also faced with a number of external shocks, such as drought, break-down of the EAC, and war, which added to already growing inflationary demand pressures.

With the rapid growth of domestic demand Tanzania's balance of payments moved increasingly into deficit. The trade account which had showed a favorable balance over the 1960s period deteriorated rapidly throughout the 1970s. Even though balances on net services and tranfers showed marked improvements during this period, they were not sufficient to cover an ever-widening gap between Tanzania's exports and imports.

Both the government' agricultural and industrial policies were found to be mainly responsible for the poor performance of the Tanzania's trade balances. Tanzania's traditional export crops which accounted for more than two-thirds of total exports fared poorly in terms of quantity growth; and few attempts was made at building up new crops. Despite the government's recognition of the importance of agriculture in Tanzania's economy the agricultural sector was neglected. Agriculture received a small proportion of public expenditures and credits extended by commercial banks. Planners also made few attempts at formulating a comprehensive pricing policy which could stimulate the production of both export and food crops. In view of little adjustment in the exchange rate, farm producers had to face a rapid deterioration in their purchasing power. This was more true in the second half of 1970s, when both growing rate of inflation and of administrative and marketing costs of the crop authorities enlargened the gap between world prices and what growers actually received.

With regard to manufactured exports, the industrial strategy had either a built-in bias toward the pre-export processing of primary products or had little to offer on the role of manufacturing sector in the Tanzania's exports. In fact industrial strategy led to the establishment of a large number of industrial ventures which were, on average, more import-oriented and less export oriented than the average-size manufacturing firms.

To fill growing trade imbalances the government relied heavily on foreign aid. Tanzania, at least until very recently, was able to obtain a substantial amount of foreign aid without compromising her long-term goals. This enabled the government to overcome fiscal and trade imbalances without depressing the domestic economy seriously.

In chapter IV we constructed a simultaneous equation system which attempted to correct some of the shortcomings of the long-run standard reserve-flow equation. The main features of the 14-equation simultaneous system were:

i)The model combined the long-run monetary approach to the balance of payments and the short-run income/absorption approaches to the balance of payments. Following the latter approach, the model defined the balance of payments on both current and capital accounts. However, in contrast to the income/absorption approaches, the balance of payments were regarded as stock-adjustment flows rather than as permanent flows. This was achieved by incorporating one aspects of the adjustment process in the way suggested by Prais(1961) and Dornbusch(1973).

ii)Both prices and real income were endogenous variables whose behavior was described by specifying an inflation equation and an aggegate demand equation.

iii)The behavior of the monetary and fiscal authorities was modelled by specifying a central bank reaction function and a treasury financing requirements equation.

iv)In constructing the model special attention was given to institutional factors governing operations of the monetary and fiscal authorities.

A. Empirical Results

The results indicated that the model did well, both in terms of the estimates of the parameters as well as the ability to track the behavior of key macroeconomic variables historically. The empirical results of the model suggested that;

i)both real income and monetary variables played a significant role in explaining the behavior of the balance of payments;

ii)the foreign reserve target variable was assigned a less important weight than other target variables, such as stabilization of the economic activites and meeting the treasury financing requirements;and

iii)the rate of change of prices responded both to changes in the stock of money supply and to the disequilibrium pressures between demand for and supply of goods available to the domestic economy.

The estimates of the price elasticities of the supply of primary export crops suggested that a significant, though not substantial, supply response occurred in Tanzania. The economy's capacity to produce exportables was also found to be statistically significant in explaining the quantity of primary exports. However, the latter response appeared to be inelastic, indicating a slower rate of growth of output for the primary sector than for the rest of the economy.

The main determinants of imports were relative prices, real aggregate expenditures, and the foreign exchange restrictions. The results indicated a significant and substantial positive response to the foreign exchange restrictions, and to the combined effects of domestic aggregate expenditures and foreign exchange restrictions. According to the estimated coefficients of these two variables, a 10 percent simultaneous increase in the real aggregate expenditures and import capacity provided by the exports tends to increase imports by about 8.7 percent within one year and by as much as 14.6 percent by the end of first eighteen months.

The parameter estimates of the central bank reaction function showed that the monetary authorities tended to accommodate the treasury financing requirements, and provided a certain level of liquidity in the face of economic growth, though at a smaller pace during the booms. However, the foreign reserve component of the monetary base did not keep pace with the rapid growth of the domestic component. This implied that the foreign reserve target variable played a less important role in the formulation of the monetary policy than other target variables. Treasury financing requirements appeared to be the main factor underlying the expansion in domestic credit. According to the estimated coefficient of the treasury financing requirements a 10 percent increase in treasury financing requirements, *ceteris paribus*, increased domestic credit by as much as 3.3 percent.

The parameter estimates of the treasury financing requirements equation suggested that both inflation and planned deficits played a significant role in the development of budget deficits. Furthermore, it appeared that fiscal authorities made little use of fiscal variables under their control to smooth the fluctuations in output and foreign reserves. The significant response of the treasury financing requirements to the rate of inflation supports the

Aghevli and Khan(1978)' hypothesis that an increase in the inflation rate tends to widen fiscal imbalances as the fiscal authority attempts to maintain real expenditures constant while tax revenues are lagging behind. However, in contrast to the Aghevli and Khan' formulation of the fiscal variables in which fiscal authorities have no discretionary power, the results of this study indicated that fiscal authorities did exercise certain discretionary power over the behavior of the fiscal variables. Treasury financing requirements appeared to be influenced greatly by government planned deficits. Furthermore, it appeared that the fiscal authorities took some measures to eliminate the gap between the desired and actual deficits.

Real private expenditures were mainly determined by real income and the excess supply of real cash balances. The latter appeared to be only marginally significant, mainly due to the accumulation of undesired cash balances by the public resulting from price control measures, frequent commodity shortages and a generally unfavorable political environment for private investment.

Monetary variables appeared to influence not only expenditures and imports but also price changes in Tanzania. Changes in the money supply were found to be statistically significantly in explaining the movements in the consumer price index. Except for import prices, other cost push factors did not turn out to be significant. However, disequilibrium pressures between the demand for and supply of goods available to the domestic economy added significantly to the explanation of price changes beyond what had been captured by the monetary factors.

B. Elasticity Multipliers

To determine the direct and indirect effects of changes in exogenous variables and in other policy variables on the key endogenous variables we derived the reduced form of the estimated version of the model. The elasticity multiplier analysis revealed some interesting information.

i)Both primary exports and imports appeared to grow at a much slower pace than the long-run full capacity output. The long-run primary exports multiplier with respect to full capacity output was found to be as low as 0.37, indicating that with full capacity output growing at an average annual rate of 10 percent primary exports grows only at 3.7 percent. The import multiplier was 0.24 the latter appear to be small for a developing country such as Tanzania. The small size of import multiplier might be due to exchange controls and quantitative restrictions on imports.

Whatever might be the reasons underlying such inelastic response of primary export sector to full capacity output, its implication for the country's balance of payments is quite clear. As is evident from table VI-2, international reserves are inelastic to changes in full capacity output. A one percent increase in full capacity output tends to lower international reserves by about 0.8 percent, even though the multiplier for imports is lower than one for primary exports. This is not surprising, considering the widenning trade deficit over the period under study as well as the growing size of foreign aid.

ii)Monetary variables appeared to play a more significant role in the adjustment process than suggested by their structural parameters estimates. The latter measured only the direct effects of changes in the monetary variables on the endogenous variable concerned, while the reduced form parameters (multiplier elasticities) measured both direct and indirect effects. Real expenditure elasticities in inflation and the real monetary balances obtained from the reduced form were at least twice as large as their corresponding values given by the private expenditures equation. Considering the significant positive response of imports to real expenditures, this suggested that monetary variables played a more significant role in the balance of payments adjustment than suggested by the parameter estimates of the expenditures equation.

C. Policy Simulation

The estimated model was also subjected to several policy shocks. Two alternative policy shocks were given to the model;

i)a 10 percent change in the policy variable or in other exogenous variables for each year over the simulation period; and ii)a 10 percent change for the period 1974-1975.

The period 1974-1975 was mainly chosen to see whether the simulation results throw any light on the government's balance of payments stabilization program at the time of the balance of payments crisis of 1974-1975. The simulation results conveyed interesting information.

1. Comparing the final net impact of a policy simulation which raises the prices paid to the farmers by the marketing boards by 10 percent with one which sets the exchange rate 10 percent lower than its historically observed value we found that; (a)the devaluation of the Shilling was more effective in improving the balance of payments; (b)real income, prices and exports rose under the two policy shocks; and (c)Imports declined under a currency devaluation, implying the expenditure-reswitching effect of the devaluation dominated the real income and the foreign exchange restrictions effects.

2. An increase in the level of net foreign capital inflows increased imports and had a negligible effect on exports and real income. These results are not surprising considering the built-in bias of foreign aid and government expenditures toward projects employing capital-intensive techniques and imported technologhy (see chapter three, section G). Furthermore, considering the relative importance of foreign aid as a source of government expenditure, the negligible effect of an increase net capital inflow might be related to the way that government expenditure was allocated

among various sectors. Agriculture received only about 10 percent of the government expenditure while it was accounting for more than 80 percent of the country's total exports (see chapter three, section G).[29]

3. A demand management policy and exchange rate policy appeared to be relatively effective in increasing real income and international reserves. A simultaneous decrease in fiscal deficits and a devaluation of the Tanzanian Shilling lowered exports and the net foreign assets of the central bank during the first two years of simulation but increased them during subsequent years. In contrast, imports and the consumer price index showed a steady decline and rise respectively over the simulation period.

These results suggest that an increase in net capital inflows is not a substitute for a demand management and exchange rate policies. In contrast to the views held by Tanzanian policy makers and shared by some economists at the time of the balance of payments crisis of 1974-1975, the demand management and exchange rate variation policies seem to be effective in improving the balance of payments. The cost of the program, as measured by losses in output and a higher inflation rate, appeared to be short-lived.

These results tend to support the Boganowicz-Bindert(1983)'s findings for Portugal, Turkey and Perus, and Khan and Knight(1981)'s findings for a pooled sample of 29 developing countries. According to these studies, demand management and exchange rate policies are essential for a stabilization program which seeks to achieve a suitable relationship between resource availibilities and the desired balance of payments and rate inflation. External assistance is not a substitute for a demand management policy, but reduces the cost of adjustment when it is combined with a demand management and an exchange rate policy.

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[29] It would be desirable to explore channels through which an increase in capital inflow affects the economy's capacity to produce exports. However, to pursue such investigation we need a more disaggregated model than the present model.

D. Limitations of the Study

This study demonstrated that it is possible to model a developing economy, such as Tanzanian economy, in a way which incorporates basic elements excluded from the standard reserve-flow equation. However, the results (including structural parameter estimates and simulation results) should be interpreted with great care considering the shortcomings of the model such as poor quality of data, high degree of aggregation, and the simplistic assumptions underlying the behavioral equations.

In Tanzania, like in many other developing countries, the preparation of national income statistics is a recent phenomenon and data on macroeconomic variables are generally less accurate than those in the developed countries. However, the reliability of the data used in this study seems to be less serious than it appears considering the highy aggregated character of our model and the predominance of relatively more reliable data, such as imports ,exports, international reserves, money supply, and government expenditures and revenues.

Another important shortcoming of this study is the highly aggregated character of our model. While we recognize that a more detailed model than the model designed in this study could have provided greater information, our choice of the size and degree of disaggregation was greatly affected by the availibility and quality of data.

Specification of the central bank reaction function and the treasury financing requirements equation seem too simplistic and incomplete. The behavior of both treasury financing requirements and domestic credit are influenced by a host of economic and non-economic variables some of which are not included in the model. Furthermore, in the absence of quarterly data for most of the macroconomic variables it proved difficult to capture fully the impact of various target variables on the behavior of fiscal and monetary authorities.

Finally, the macroeconomic model designed in this study and the results based on it are subject to limitations inherent in all macroeconomoic models. Some of the assumptions used in the specification of the behavioral equations are quite ad hoc and alternative judgements and decisions may have been made perhaps with possibly significantly different results.

E. Policy Implications

Considering the highly aggregated character of the model designed in this study, any policy implications derived from its results can only be of the most general variety. Given this qualification, the results provide some interesting policy implications.

First, as long as Tanzania's exports continue to be dominated by primary export crops the development of agriculture sets the foundation for achieving sustained economic growth, price stability, and a healthy balance of payments. Agriculture was neglected in the past development strategies pursued by the Tanzanian planners and as a result lagged substantially behind the growth rate experienced by the economy as a whole. To reverse the past trend, real commitments should be made in terms of directing resources toward the development of economic programs for the rural areas. Considering the significant and positive response of primary exports to reductions in relative export prices, steps should be taken toward formulation of a comprehensive agricultural pricing policy which provides an steady and adequate incentives for the expansion of output. The recent increases in prices of both food and export crops seems to indicate the government's recognition of its past mistakes.

Second, even though imports were inelastic with respect to real expenditures, the demand for imports appeared to respond significantly to a simultaneous increase in real expenditures and foreign exchange restrictions. These results suggest that a liberalization of imports will rapidly deplete foreign reserves, as was the case for the import liberalization in 1978, unless import liberalization policy is followed by an export promotion policy, a devaluation, or a capital inflow which make it possible to sustain the rapid growth of imports.

Third, the parameter estimates of the treasury financing requirement equation and the central bank reaction function indicate that there is a two-way causation between the expansion in liquidity and the rate of inflation. An increase in treasury financing requirements is mainly financed by the central bank which results in an increase in the rate of inflation and thereby a further increase in fiscal imbalances. Under such circumstances, a passive fiscal policy might be quite hazardous. These results suggest that the fiscal authorities should aim to keep the goal of price stability by maintaining a 'suitable' relationship between availble resources and government expenditures. During the second and third development plans, the government expenditures far exceeded beyond the allowable expenditures set by the long-run level of government domestic revenues.

F. Suggestions for Further Research

There are several directions which the model designed in this study might be usefully extended.

1. A more detailed analysis of the determinants of imports, primary and non-primary exports, and capital flows. Both non-primary exports and capital flows were here treated as exogenous varaibles.

2. Both the central bank reaction function and the treasury financing requirements equation could be analysed on a more disaggregated basis.

3. The expected inflation rate was assumed to be generated by an adaptive expectation mechanism. Though the adaptive expectation model appeared to be empirically reasonable, there are alternative assumptions about the ways in which the public form its expectations and which have proved to be superior to the former. These models of price expections can be incorporated into the model designed in this study as more data becomes available.

4. Finally a successful formulation of a macroeconomic model needs an improvement in data.

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APPENDIX I

Table A-1. Indices of Volume and Prices of Six Major Export Crops, 1962-1981.
(1967-1969 average=100)

	Sisal		Coffee		Cotton		Tobacco		Tea		Cashewnuts	
	Q(1)	P(2)	Q	P	Q	P	Q	P	Q	P	Q	P
1962	104	154	58	95	55	107	19	62	53	120	49	58
1963	104	228	62	98	73	105	26	135	62	112	56	70
1964	111	224	73	125	85		24	82	60	103	72	88
1965	104	146	74	115	104	104	57	82	71	104	72	96
1966	108	128	107	112	123	96	57	85	86	106	81	102
1967	105	107	87	100	111	97	86	103	90	106	74	97
1968	94	91	112	102	81	106	81	99	100	100	114	96
1969	101	101	102	98	109	97	132	98	111	94	112	108
1970	98	89	110	131	120	95	125	94	108	90	110	111
1971	88	88	101	120	103	105	135	112	133	86	125	93
1972	76	102	113	131	122	123	161	108	161	85	124	99
1973	75	210	121	155	103	131	148	113	161	84	143	95
1974	69	533	98	172	114	223	207	123	165	105	120	128
1975	60	320	137	167	93	180	161	162	176	115	116	136
1976	55	305	122	414	112	259	218	209	165	164	83	148
1977	51	373	107	740	106	314	208	221	192	218	96	187
1978	45	296	116	492	100	279	245	248	233	165	68	272
1979	39	354	108	499	89	297	193	260	222	160	56	287
1980	42	561	114	407	96	298	193	150	219	200	41	497
1981	36	523	134	401	93	336	190	172	214	186	34	854

Notes:
(1) Q= Marked output.
(2) P= Price.

Sources: Compiled by the author using prices and quantities given in Annual Economic Survey and Marketing Development Bureaue, various issues.